ENGINEERING NEWS-RECORD

Girders cantilever 142 feet over jets p.38

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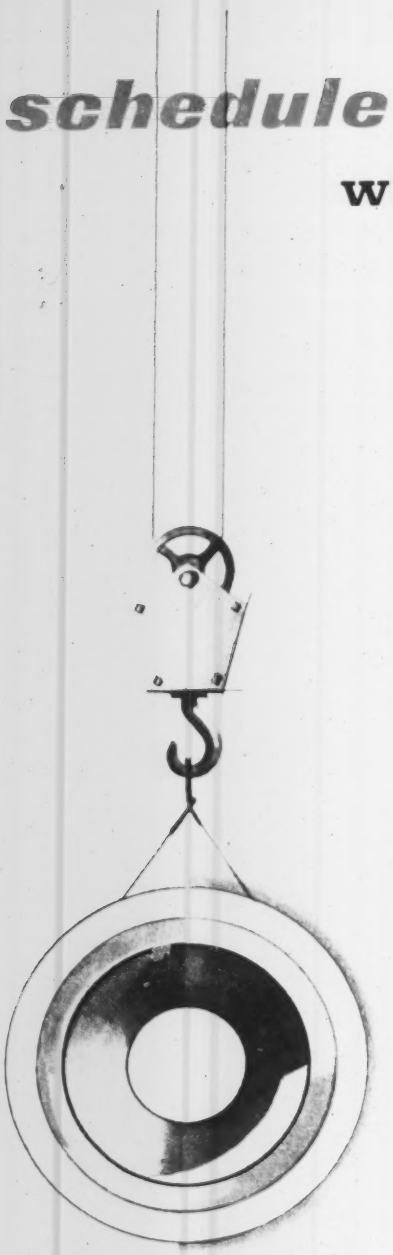

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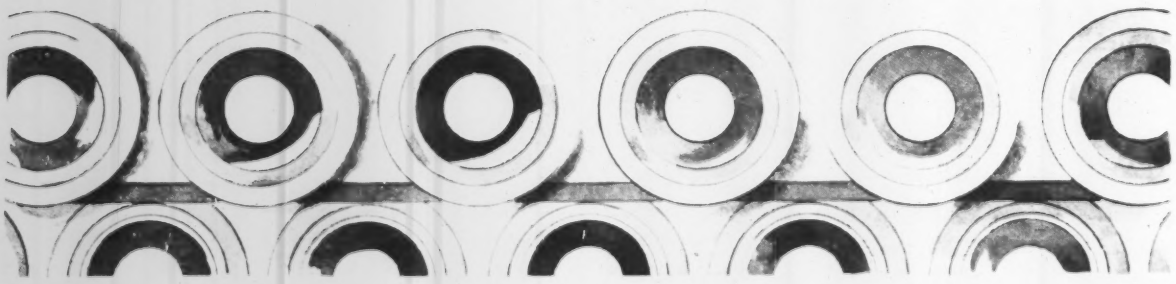
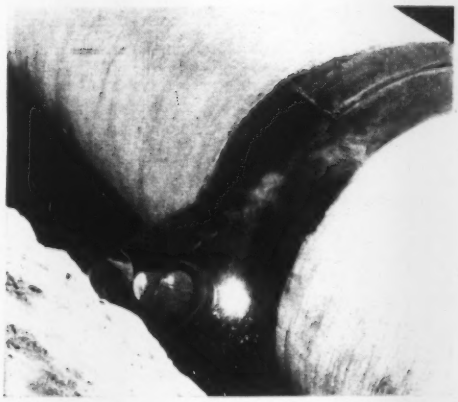


St. Paul installing 7½ mile steel main



Welding a joint for the coal-tar-enamel coated and wrapped pipe. It is being supplied by Bethlehem Steel in 40-ft lengths. Contractor is Ashbach Construction Co. Consulting engineers: Black & Veatch. St. Paul, Minnesota Board of Water Commissioners: Milton Rosen, President; Leonard N. Thompson, General Manager.

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EIGHTY-FIFTH YEAR OF PUBLICATION

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ENGINEERING NEWS-RECORD, Vol. 162, No. 16, APRIL 23, 1959

Published weekly by McGraw-Hill Publishing Company, James H. McGraw (1860-1948), Founder. Publication Office, 99-129 North Broadway, Albany 1, N. Y. See panel below for directions regarding subscriptions or change in address. **Executive, Editorial, Advertising and Circulation Offices, McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y.** Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice President; L. Keith Goodrich, Vice President and Treasurer; John J. Cooke, Secretary; Nelson Bond, President, Publications Division; Shelton Fisher, Senior Vice President; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising **Sales**; A. R. Venezian, Vice President and Circulation Coordinator. **Subscriptions are solicited only from persons with identifiable commercial or professional interests in construction and building. Position and company connection must be indicated on subscription orders.** United States subscription rate for individuals in the field of this publication $6.00 per year; single copies 30 cents; foreign $20 per year, payable in advance. Second Class mail privileges authorized at Albany, New York. Printed in U. S. A.

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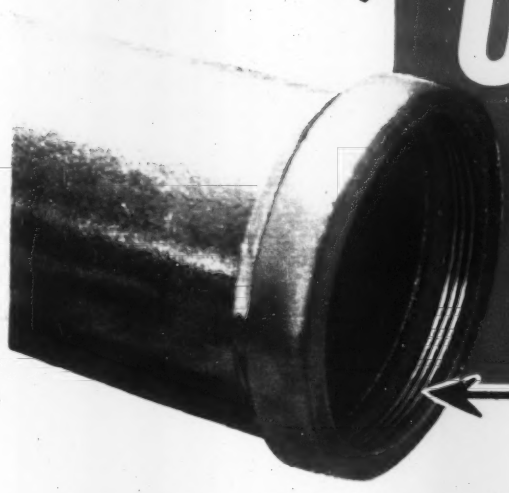

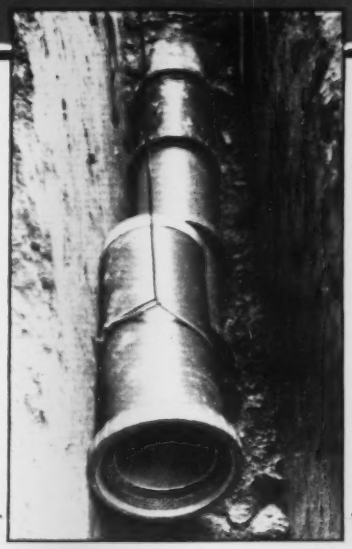

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PROJECT: High level Interceptor sewer for City of Mansfield, Ohio.

ENGINEERS: Phil Marcus, City Engineer, Mansfield, Ohio, and Floyd Browne & Associates, Consultants, Marion, Ohio.

CONTRACTOR: Crano Construction Company, Akron, Ohio.

PIPE: 6" to 24" Universal Vitrified Clay Pipe with pre-assembled Tylox rubber Gaskets.

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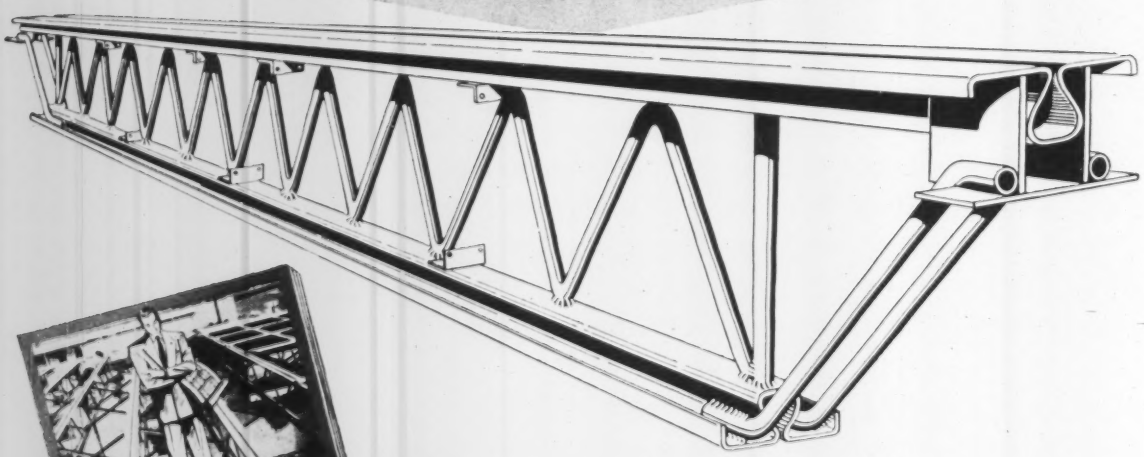

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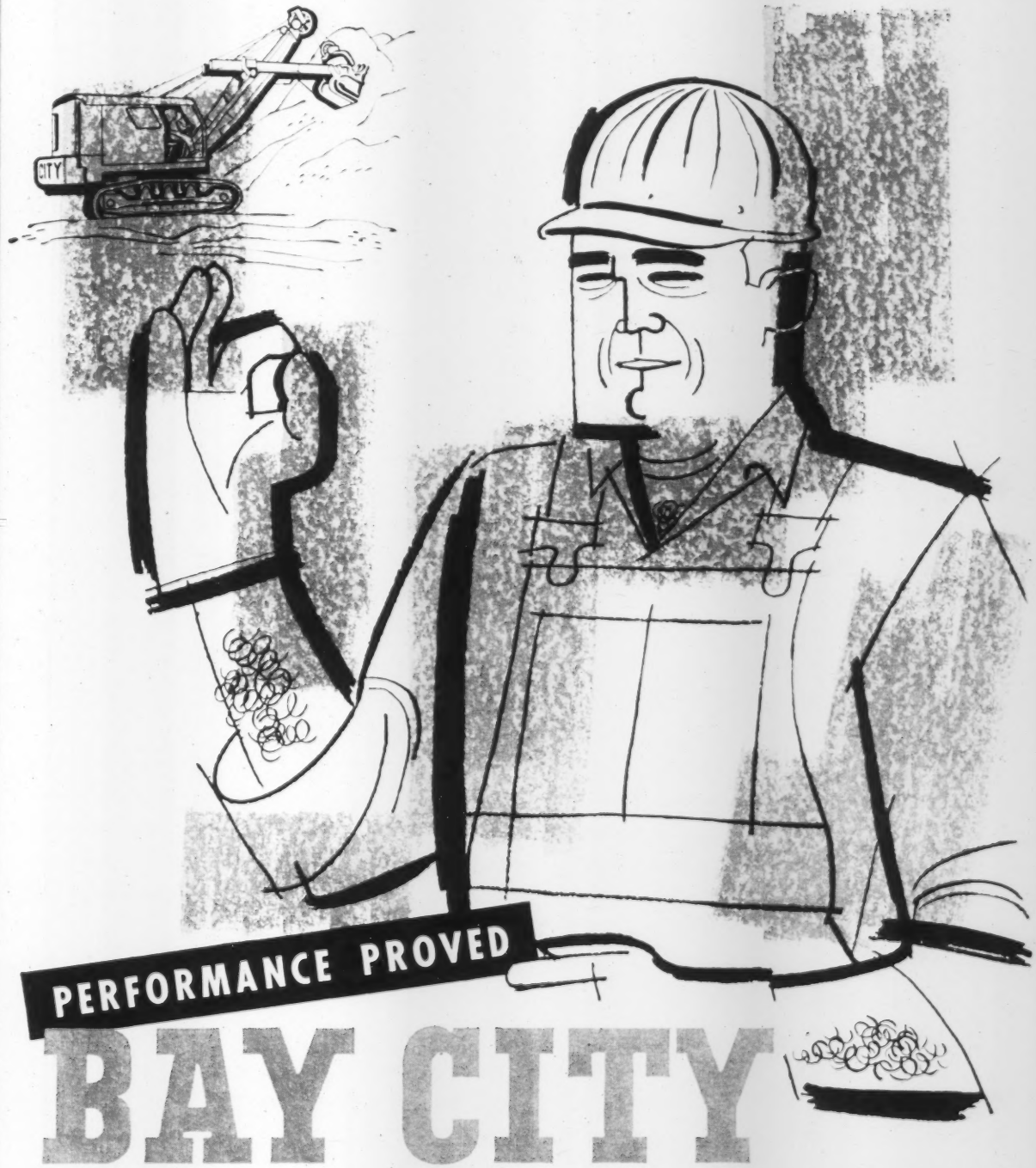

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Jones-Tompkins complete world's highest earthfill dam

Allis-Chalmers Construction Machinery Helped Beat High-Speed Schedule

Sixteen million cubic yards of rock and fine conglomerate fill were piled 512 feet high to form the world's highest earthfill dam. J. A. Jones Construction Co. and Charles H. Tompkins combined their dirt-moving "know-how" to construct the record-breaking $58,000,000 Swift Creek Dam on the Lewis River in Washington. Jones and Tompkins used Allis-Chalmers torque converter crawler tractors and Allis-Chalmers motor graders for pioneering, spreading, compacting and grading. Bill Kennish, project superintendent, supplies the reasons why: "The Allis-Chalmers machines have proved themselves here where the going was really tough and the schedule even tougher."

The Swift Dam was a 30-month job—from turning the first earth to first delivery of power from its 204,000-kw generators. Electric power began to flow in December, 1958. The earth-moving operations finished 20% ahead of schedule.

The earthfill contract operation, a joint venture by Jones-Tompkins, was worked to plans and specifications of the Bechtel Corporation, San Francisco, which holds the design and engineering contract with Pacific Power & Light Company.

Bill Kennish, project superintendent
Jones-Tompkins Construction Co.

Borrowing and hauling operations were handled by draglines, shovels and trucks . . . pioneering, spreading and compacting by a fleet of Allis-Chalmers torque converter crawler tractors. Much of the dozing was done on steep slopes of the dam and the surrounding terrain. Allis-Chalmers motor graders maintained the heavily used truck haul roads. Daily earth moving and spreading production averaged 48,000 cubic yards—often reached 60,000 cubic yards.

The dam is 512 feet high, with a crest length of 2,100 feet and a base thickness of 1,950 feet.

Bill Kennish, project superintendent, paid tribute to Allis-Chalmers machines for their

CONTRACTORS ON THE JOB:

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California

J. A. Jones Construction Co., Inc.
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North Carolina

Charles H. Tompkins Co.
Washington, D.C.

Jones-Tompkins
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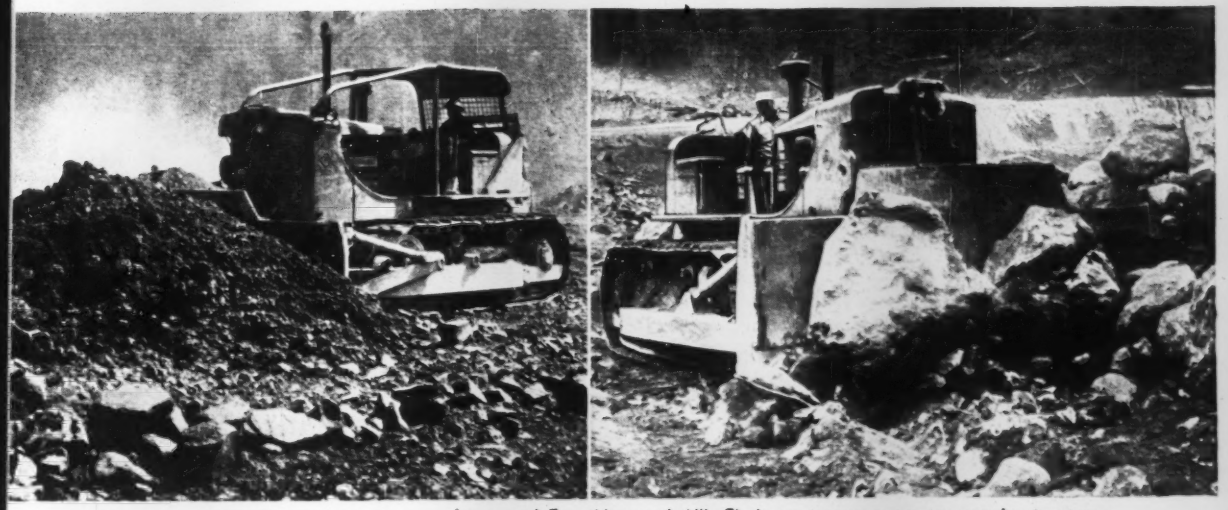
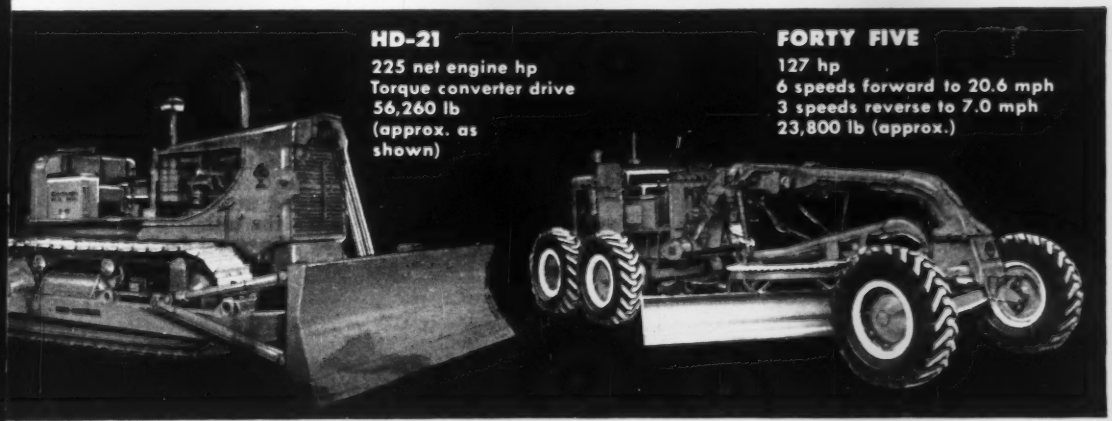


Jones and Tompkins used Allis-Chalmers torque converter crawler tractors to handle the tough dozing work on this, the world's highest earthfill.

"power, balance and especially trouble-free operation." He also commended his Allis-Chalmers dealer with the comment, "They have given us good service. We appreciate it. In remote locations like this, we simply cannot afford to gamble with equipment and service."

The excellent performance of Allis-Chalmers construction machinery, backed by *outstanding* Allis-Chalmers dealer service such as Jones-Tompkins has experienced, is yours, too. Your Allis-Chalmers dealer will recommend equipment. Arrange a demonstration . . . no obligation. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

This Allis-Chalmers FORTY FIVE motor grader helped keep the Swift Creek Dam rising rapidly by keeping haul roads and fill in high-speed condition.



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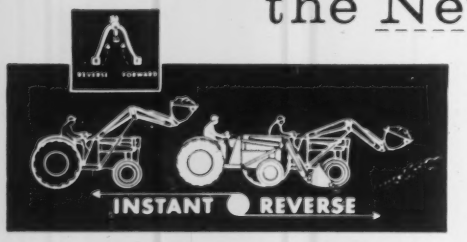

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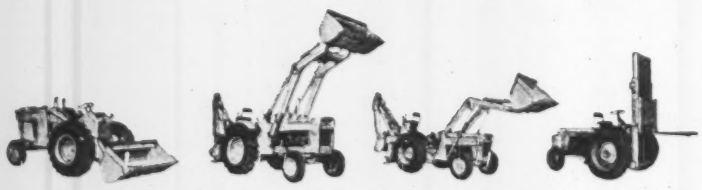

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Supervision Is Not A Cure-All

SIR—I was particularly interested in reading the editorial entitled "A Plea for Supervision" (ENR Mar. 5, p. 104). Having been connected with the construction industry for over 20 years alternately as a supervising construction engineer for owners, architectural and engineering firms, and as a general superintendent for general contractors, it is my opinion that merely including the field supervision as the responsibility of the designer is not a panacea for preventing design or construction deficiencies that may or may not result in catastrophies, but that often result in costly and time consuming corrective measures. Here are the reasons:

• **All too frequently the designer does not catch his own errors.** I know of an industrial plant of over 1 million sq ft of floor area with structural steel frame and metal roof deck designed by a reputable firm and constructed within recent years in which it was not discovered until after the steel was completely fabricated and substantially all erected that the steel and deck had not been designed at all adequately for snow loads. The result, of course, was very costly reworking of the steel structure after erection.

• **Too frequently, where the designer has the responsibility for field supervision, the person (or persons) employed by the designer for field supervision is reluctant to question the design by his employer.** The designer's field supervisor may be very effective in seeing to it that the contractor fully complies with the design drawings and specifications (right or wrong) but often gives insufficient attention to the contractor's methods. For example: In reinforced concrete work he may take special pains to see that the quality of form material and workmanship of same is proper for the finished job, but he may be completely unconcerned as to whether or not the shoring and bracing is adequate to withstand the loads imposed during pouring of concrete.

• **The contractor may be cognizant of possible design errors as early as during the bidding stage, but, unfortunately, is reluctant to make an issue of same with the designer;** the design is not his responsibility and, perhaps more significant, he is ever conscious of the possibility of jeopardizing his status with the designer when it comes to bidding future projects. Also unfortunate, but true, there are contractors who realize that design deficiencies will mean additional compensation to them for corrective measures when the deficiencies are discovered.

As the above matter has been of much concern to me over the years, it is my opinion, based on experience, that probably the best procedure for preventing or minimizing design and construction deficiencies is for the owner to either have in his employ a qualified engineering staff or to employ a separate engineering organization (with the full knowledge of designer and contractor) to check the drawings and specifications by the designer and to supervise the construction.

G. C. SCHWESER
Construction Engineer
McDonnell Aircraft Corp.
St. Louis, Mo.

No Support for EJC?

SIR—In catching up on back issues of ENR, I was extremely interested in the editorial and letter in the issue of Jan. 8 re unity in the engineering profession, and the follow-up letters in the Feb. 19 issue. I hope you will permit me to comment at this late date; it will be a live issue for some time to come, I am sure.

After the seven years of trial of Engineers Joint Council as the unity organization, there seems to be no grass roots satisfaction that it is the best plan. I believe most engineers want an over-all unity organization that can truly speak for the profession and represent the individuals in the profession. However, EJC, a federation at the very top level, has not done this.

The great societies are not banded together in a true sense, with the full backing of all individual members. It is the Indians that must be so banded, and not just the chiefs. Why should the National Society of Professional Engineers join up to become submerged in a federation with which most of the individual members, already supposed to be represented, feel no allegiance or real connection?

Since you refer to an editorial of 14 years ago, I would like to refer to a letter of mine of eight years ago, which I feel is still very apropos in view of the great dissatisfaction with EJC. ENR was good enough to publish it in its July 5, 1951, issue under Reader Comment. It stressed the need for a unity

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

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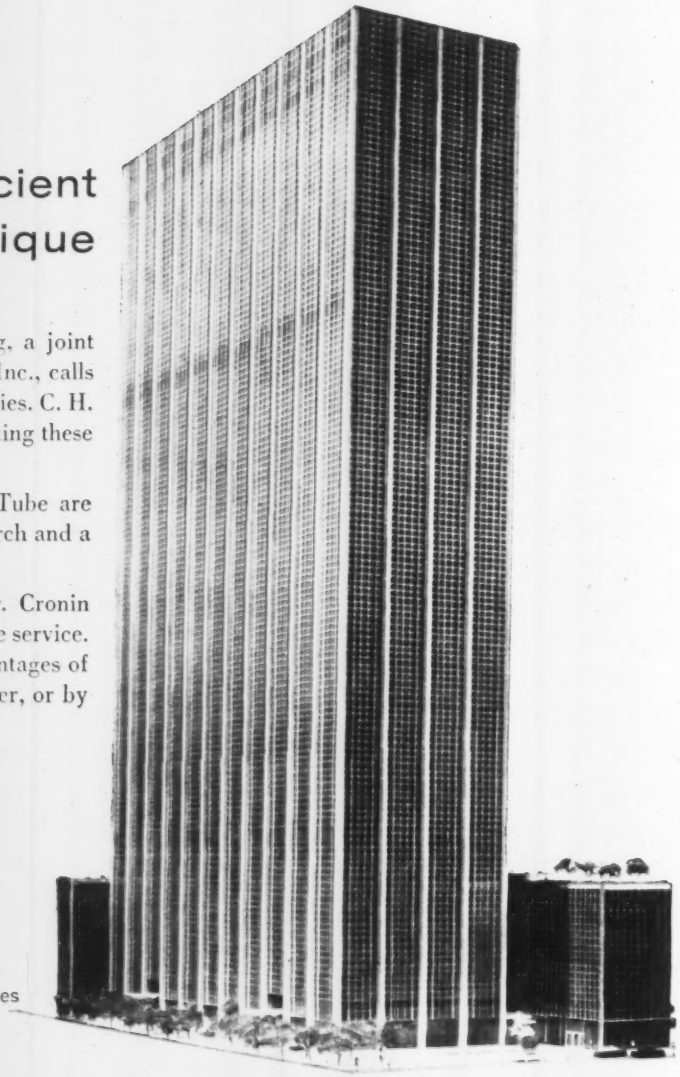

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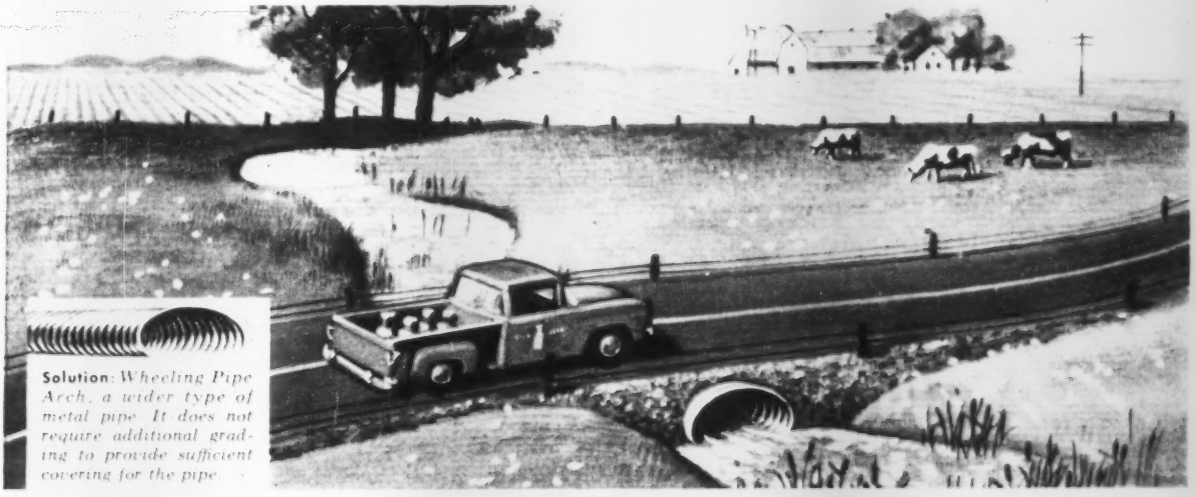
METAL CULVERT PIPE BY WHEELING

Problem: *How to channel the flow of this shallow, meandering creek? Standard round pipe would take too much headroom.*

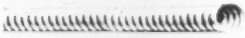
Headroom limited?



Solution: *Wheeling Pipe Arch, a wider type of metal pipe. It does not require additional grading to provide sufficient covering for the pipe.*

Use Wheeling Pipe Arch for fast drainage!

Large-diameter Wheeling Culvert Pipe—easily controls normal flow of fast-moving streams.



Small-diameter Wheeling Metal Pipe—ideal for farm and home drainage requirements.

Particularly effective for shallow streams, Wheeling Pipe Arch assures fast, efficient water flow. That's because it has a wide, comparatively flat base that permits more rapid drainage than round pipe of equal area. And it has the same toughness and durability that made other types of Wheeling Culverts famous.

Wheeling Metal Culvert Pipe or Pipe Arch, in copper-bearing steel or copper-bearing pure iron, plain galvanized or bituminous coated (with or without paved invert) is available in a wide range of gauges and diameters.

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...offers maximum adhesion...resistance to impregnation

This new cold-applied sealing compound is the ideal sealant for PCC highways, bridge decks, parking lots and industrial floors. It is a two-component polysulfide polymer that is cold-applied and cures rapidly.

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organization with individual representation and control of the management. Like AMA it must be a grass roots organization. Yet, unlike the AMA, the rank and file membership must combat their own leadership to achieve the organization the majority seems to want.

I, too (as did reader Schulz in your Feb. 19 Reader Comment) have challenged the Founder Societies (since 1951) to poll their memberships on this issue.

T. H. EVANS
Dean of Engineering
Colorado State University

Costs of Marinas

Sir—Your article, "Building Parking Space for Boats" (ENR April 2, p. 82) was illustrated with a picture of Fort Lauderdale's Bahia Mar Marina, which I would like to point out was designed by J. H. Philpott, senior partner in our firm. It should also be noted that the cost of Bahia Mar was approximately $3.2 million and not $20 million as reported.

ARTHUR W. SAARINEN
Philpott, Ross and Saarinen
Consulting Engineers
Fort Lauderdale, Fla.

Editor's Note—The $20 million Bahia Mar estimate was supplied by boating industry sources. It includes not only the original outlay of $3.2 million, but investment in commercial facilities added since.

For Your Calendar . . .

Association of Iron and Steel Engineers, Hotel Statler, Buffalo, N. Y., Apr. 27-29.

Annual General Meeting of Consulting Engineers Council, Biltmore Hotel, New York City, Apr. 28-May 3.

American Society of Testing Materials, Detroit District, Detroit, Mich., Apr. 29.

American Society of Mechanical Engineers Metals Engineering Conference, Hotel Sheraton-Ten Eyck, Albany, N. Y., Apr. 29-May 1.

Maintenance and Plant Engineering, National Conference, Edgewater Beach Hotel, Chicago, Ill., May 4-5.

American Society of Civil Engineers Summer Convention, Sheraton-Cleveland Hotel, Cleveland, Ohio, May 4-8.

Purdue Industrial Waste Conference, Purdue University, Lafayette, Ind., May 5-7.

American Society of Planning Officials, National Planning Conference, Leamington Hotel, Minneapolis, Minn., May 10-14.

International Commission on Irrigation and Drainage Technical Conference, Reno, Nev., May 11-22.

Symposium on Industrial Uses of Radioisotopes, Georgia Institute of Technology, Atlanta, Ga., May 11-12.

46th Annual Convention of the National Rivers and Harbors Congress, Mayflower Hotel, Washington, D. C., May 13-14.

American Concrete Agricultural Pipe Association, Brown Palace Hotel, Denver, Colo., May 13-15.

Building Research Institute Conference on Building Illumination, Statler-Hilton Hotel, Cleveland, Ohio, May 20-21.

Jet Airport Conference of ASCE Air Transport Division, Shamrock-Hilton Hotel, Houston, Tex., May 20-22.

Design Engineering Show, Convention Hall, Philadelphia, Pa., May 25-29.

announces 2 new

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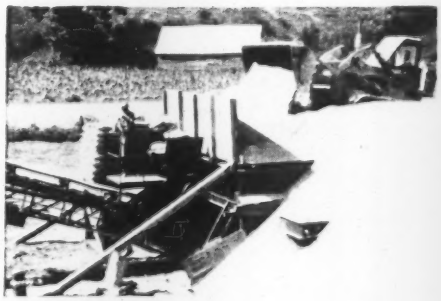
for better control of proportions in base materials . . . better final mixing . . . plus extreme portability



Aggregate conveyor, which carries aggregate from feeder to mixer, is of the belt type, with direct electric drive.

● Highway officials are becoming more and more exacting in their requirements for accurate proportioning and control of base materials, as well as in final mixing. They are specifying that the stabilized materials be premixed with more care and greater control.

To provide this better control in large capacity operations, also to provide maximum portability, H&B engineers have developed two new mobile Stabilization plants with capacities up to 400 cu. yds. per hour.

Both of these Stabilizers are unit type plants, with individual units operated by electric drives. The Feeder, Mixer and Aggregate Conveyor are wheel mounted to operate in running position without jacking up or cribbing. The cement conveyor, also electrically driven, has a variable speed drive for accurate control of cement feed volume according to the mixing formula.

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ENGINEERING NEWS-RECORD

Vol. 162, No. 16 April 23, 1959

Number of copies printed this issue 84,516

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THE CONSTRUCTION WEEK

TOUGHER BARGAINING?—Delaware has given birth to a new organization whose activities may increase the frequency or severity of strikes. The new company—United Employees Insurance Co.—plans to insure wages of union workers for as much as $62.50 a week for a maximum of 12 weeks against time lost during authorized strikes. Insurance will be written on a group basis; at least 80% of a union's membership must subscribe for initial coverage.

UNPLUGGING THE PERIBONKA—Engineers set off 30 tons of explosives this week to open a hole in the bed of the Peribonka River just above Aluminum Ltd.'s new Passe Dangereuse Dam in Quebec Province. The underwater blast let water into an intake passage tunneled up from below. Later this year, another plug 640 ft down the tunnel will be taken out to let water into the six-mile tunnel leading to the powerhouse.

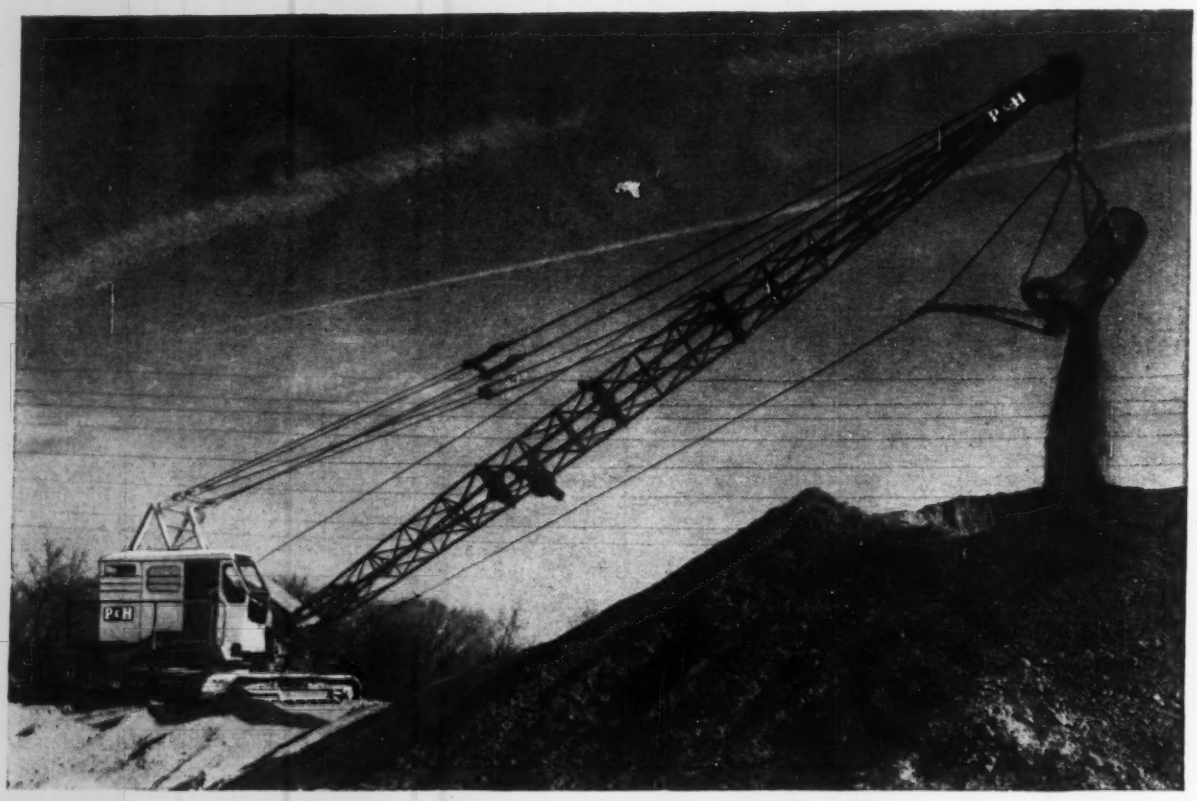
POST OFFICE OVERHAUL—Within the next two years post offices in 11 major cities will be completely made over into semi-automatic units. Cost: $60 million for construction, $25 million for equipment. These eight cities—Detroit, Denver, Harrisburg, Portland, Ore., Oakland, Houston, Oklahoma City and New York City—will get brand new plants.

DON'T KILL THE GOOSE—Chances are good Congress will approve a 5¼% interest rate for home mortgages guaranteed by the Veterans Administration. But the National Association of Home Builders is already warning lenders not to demand discounts, or Congress may pass a direct loan program for housing.

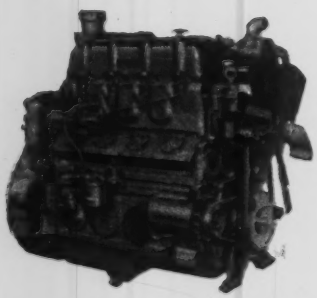
TOO LATE?—Morrison-Knudson Co., Boise, Idaho, has offered to build Argentina's 700,000-kw power project at El Chocon Falls in half the time and for less money than proposed by a European consortium (ENR Aug. 14, 1958, p. 53). However, the European group's bid—$125 million and six years' time—has already been accepted in principle.

DRAINS COULDN'T TAKE IT—Away, that is. The Water Division of the Ohio Department of Natural Resources says poor city drainage was a major cause of flood damage last January. The group will issue a comprehensive report on the floods on completion of studies now under way.

ENGINEERED FOR LAWYERS?—A motorist involved in an accident in Solvay, N. Y., has won a $35,000 judgment against the town. The curve that caused his mishap had also caused several previous accidents, he charged, and the community did nothing to remove the danger.



P&H DIESEL POWER
produces "profit-tons"



2-cycle P&H Diesels are available in 2, 3, 4 and 6 cylinder models from 40 to 280 H.P.

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A rugged, heavy-duty engine with high torque, the P&H Diesel provides the power to really dig in and do a days work. It operates best on No. 2 fuel oil and burns less of this low cost fuel. 25% fewer parts and all wearing parts interchangeable assure low maintenance cost. With the simplified P&H fuel injection system *one adjustment times the entire engine.*

For all your sand and gravel equipment—including rock crushers, clamshells and front end loaders—specify the one diesel with all the features that increase production and lower tonnage cost—P&H Diesel! See your P&H dealer or write for "Power For More Profit," Bulletin Z-26.

HARNISCHFEGER

P&H **Diesel Engine Division**
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WASHINGTON OBSERVER

- AEC and Democrats near reactor agreement
- Federal review of steel price hikes?
- Court limits anti-picketing suits

● **The lines of a $175-million reactor construction program for fiscal year 1960 are emerging** in Washington. Key Democrats on Capitol Hill are trimming their list of demands, and are close to an agreement with the Atomic Energy Commission on the details.

The final package is expected to include authorization and funds for eight or nine new projects, although the Joint Committee on Atomic Energy may add another project or two.

Here are the reactors expected to be approved:

A 60,000-kilowatt heavy-water reactor fueled with natural or enriched uranium; a 25,000-kw. gas-cooled reactor at Oak Ridge, Tenn., to be owned and operated by the government; an advanced, high temperature gas-cooled reactor to be constructed by a group of utilities with government aid; a boiling water reactor with nuclear superheat, to be built either in Puerto Rico or the U. S.; a small organic-cooled experimental reactor to be built by AEC in Idaho; a small process heat reactor prototype, and two small reactors to be built in cooperation with rural electric co-ops or public power agencies.

● **Steel makers and steelworkers took their case on the upcoming contract negotiations before Congress and the public this week.** Representatives of both appeared at Senate hearings on a controversial bill that would require government review of proposed industry price hikes including those of steel, construction materials and machinery.

The bill, sponsored by Sen. Joseph O'Mahoney (D., Wyo.), would require major companies to post increases with the Federal Trade Commission 30 days before the effective date. The FTC would hold hearings, but could not reject the increases. The aim would be to have public opinion exert a tempering influence on industry to moderate price hikes.

Roger Blough, chairman of U. S. Steel Corp., and David McDonald, president of the steelworkers union, both agreed to testify at the hearings staged by the Antitrust and Monopoly Subcommittee headed by Sen. Estes Kefauver (D., Tenn.), one of their most persistent critics.

The hearings concentrated on the pre-price notification bill but Mr. Blough and Mr. McDonald used the appearance as part of their pre-bargaining maneuvering. They sit down to actual bargaining on May 5, and are now actively engaged in seeking to win as much public support as possible beforehand.

● **The U. S. Supreme Court says states may not award damages against unions for peaceful picketing that violates state law** in cases where federal law gives primary jurisdiction to the National Labor Relations Board.

With this week's new decision, the court leaves the situation like this: States may act against violent union activity (even though the conduct also violates Taft-Hartley) but they cannot act against peaceful conduct if it comes under Taft-Hartley.

The case involved peaceful picketing by the San Diego Building Trades Council and two member unions against the Valley Lumber Co. in 1952. When the NLRB refused to take jurisdiction of the dispute, state courts enjoined the picketing and imposed a $1,000 fine on the unions.

AGGREGATE HANDLING BELTS

24" conveyor belt carrying rock from crusher rolls.

"Only 'U.S.' Belts hold up in handling crushed rock,"

says vice president of plant

"We use hundreds of feet of 'U.S.' Belting", says G. H. Lindekugel, Jr. of G. H. Lindekugel & Sons, Mitchell, So. Dakota. "Performance is extremely good. Our operation consists of highway construction and pit deposits. We average 600 tons per hour at our crushing plant. U. S. Rubber Belts work 12 hours a day, 6 days a week, carrying rock and gravel. We have no complaints. *Couldn't find any other belts that could handle crushed rock for any length of time.* 'U. S.' belts have been three years on the job, are in good condition".*

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ENGINEERING NEWS-RECORD

States Plan Record Road Spending

- **Highway and bridge construction contracts in the continental U. S. could hit $5.3 billion this year.**
- **But how close actual awards come to planned volume will depend on the amount of state matching funds available.**

State highway departments are budgeting $4.7 billion for highway and bridge contracts this year, including federal-aid funds. That's 10% more than the $4.3 billion let last year and a new state spending record.

This record volume of awards is planned by 46 states and the District of Columbia. Two states—Arkansas and Connecticut—could not report their figures, but together they may add as much as $100 million to the total.

Another $500 million should be added by city and county road agencies and by tollroads. Local governments contracted for $514 million in 1957 and $494 million last year, according to the U. S. Department of Commerce. Tollroad agencies will probably contract for $25 million to $35 million worth of construction.

It adds up to a possible $5.3 billion worth of highway and bridge construction that could go under contract this year in the continental U. S. To this you can add $57 million planned by Hawaii and Puerto Rico. Most road construction in Alaska is still done by the U. S. Bureau of Public Roads.

The availability of state matching funds, however, could turn out to be a sour note in the spending symphony. Contracting plans reported to ENR have tended to overshoot actual awards since 1956, when the Interstate Highway program started. Last April, for example, 46 states and the District of Columbia reported road and highway budgets of $4.6 million—7% more than the actual amount finally awarded.

But even if the spread between promise and performance is as great this year, awards would still top 1958, still set a new high.

A couple of states are having money problems that could seriously affect their contracting. Oklahoma's financial woes show up in a 51% cut in state highway contracts projected for this year. Although Michigan plans a 34% jump in awards, the state is having extremely difficult financial problems.

Lack of funds is probably the chief reason why ten other states are cutting back on highway contracting plans.

Although Virginia won't be able to match all the federal road money allocated to it this year (ENR Apr. 9, p. 22), the state is nevertheless budgeting a 61% jump in contract volume.

Thirty-five other states and the District of Columbia plan to let more highway and bridge contracts this year than last. Biggest increases are budgeted by Montana, New Jersey and D. C.—more than double 1958 volume in each case. Increases in other states range to 75%.

A 39% jump in Interstate Highway construction accounts for nearly all the increased spending plans. Plans for state-aided highways outside the Interstate net are up by a modest 1%.

Contracting plans for the federally aided primary, secondary and urban (ABC) roads are down 12%. This drop is to be expected after last year's unusually high volume, which was stimulated by the federal government's "D" funds program of $400 million in anti-recession, "emergency" money for immediate conversion to contract.

Actually, it's surprising that the dip in ABC road plans is only 12%. "D" funds, which were available on a 1/3 state matching basis, could have provided more than $600 million in construction contracts last year. Yet state ABC plans for this year are only down about $250 million. Possible explanation: States last year switched projects from regular ABC to "D" funds in order to take advantage of the more favorable terms (ABC funds are available on a 50-50 matching basis). This resulted in a greater carryover of regular ABC allocation to 1959-60.

Most states plan to spend more this year for force account maintenance of highways and bridges. One state, Massachusetts, plans to increase contract maintenance. And West Virginia, while gouging 95% out of its force account maintenance budget, is trimming contract maintenance 26%.

Total contract maintenance planned for 1959 is $80 million, 3% under awards in 1958. Michigan and Wisconsin have the biggest contract maintenance budgets—$14.5 million each.

Planned purchases of construction and maintenance equipment are up a total of 7% in 44 states and the District of Columbia. They plan to buy $73.3 million worth of equipment this year. Pennsylvania, budgeting $10 million, will be the biggest customer. At least $1 million each will be spent by 28 states.

Budgeted outlays for consultant services total $61.3 million, down 18% from last year. But 36 states and the District of Columbia plan to use consultants at least to some extent, and 12 states plan to buy more consulting services this year than they did last.

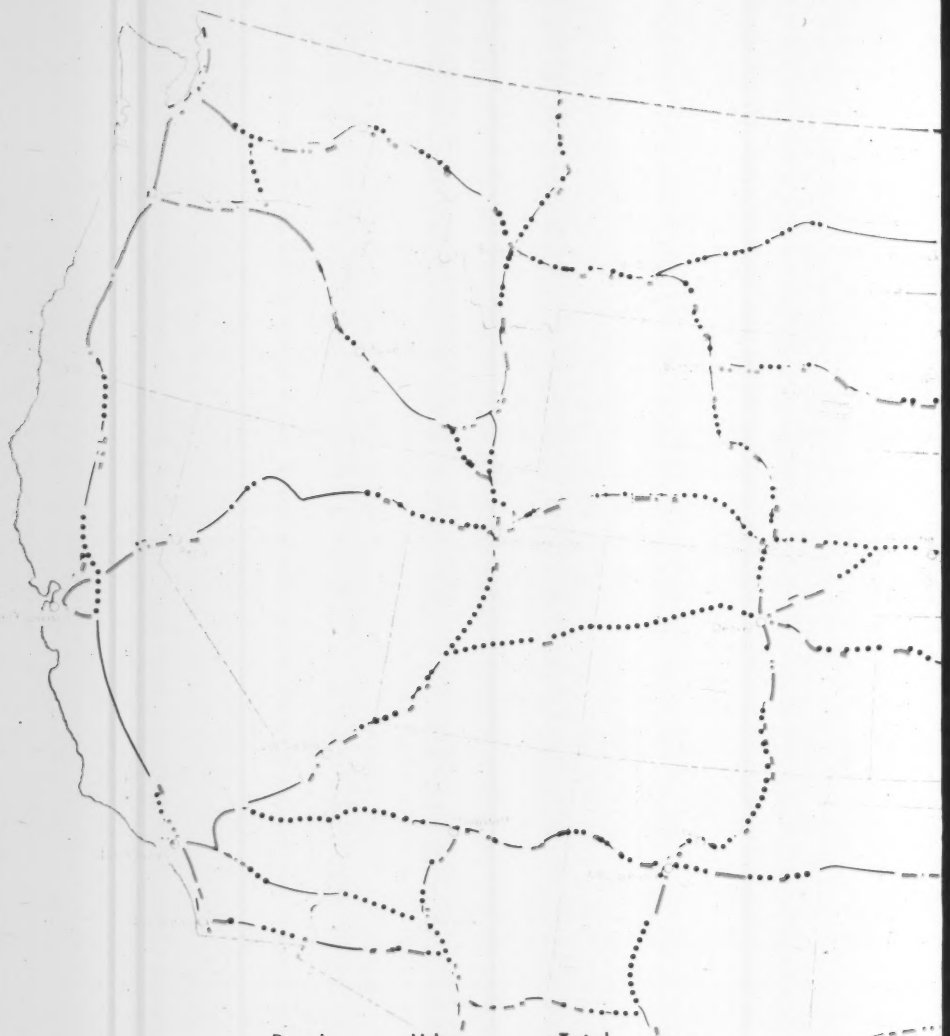
Twenty three states will cut back on the use of consultants. Pennsylvania leads this group, clipping $5 million off last year's $12-million consultant bill.

The Middle West will be the greatest regional market for consultants. States there will spend anywhere from $2 million to $5.8 million each for such services. Louisiana and Kentucky will be the biggest southern customers, budgeting $4 million each. The Middle Atlantic states will remain a good market, with New York adding $3.5 million and Maryland, $2.5 million to Pennsylvania's sizable outlays.

In addition to the chronic problems of finding funds and acquiring right-of-way, state highway officials this year also are worrying about the threatened steel strike.

Staff shortages no longer appear to be a major concern; engineers are in generally good supply. Federal money is coming through nicely and bids are coming in close enough to estimates.

(For detailed figures on state highway spending plans, see p. 100.)



	Rural	Urban	Total
Construction completed or under way	9,626	1,837.5	11,463.5
Right-of-Way Acquired & Surveys & Design completed	270.9	70.9	341.8
Right-of-way acquired	225.9	72.0	297.9
Surveys & design completed	988.3	85.5	1,073.8
Surveys & design & right-of-way acquisition under way	13,342.3	1,787.5	15,129.8
No work started	11,463.0	905.0	12,368.0
Total	35,916.4	4,758.4	40,674.8*

plus 325.2 miles not yet assigned to routes equals 41,000 miles

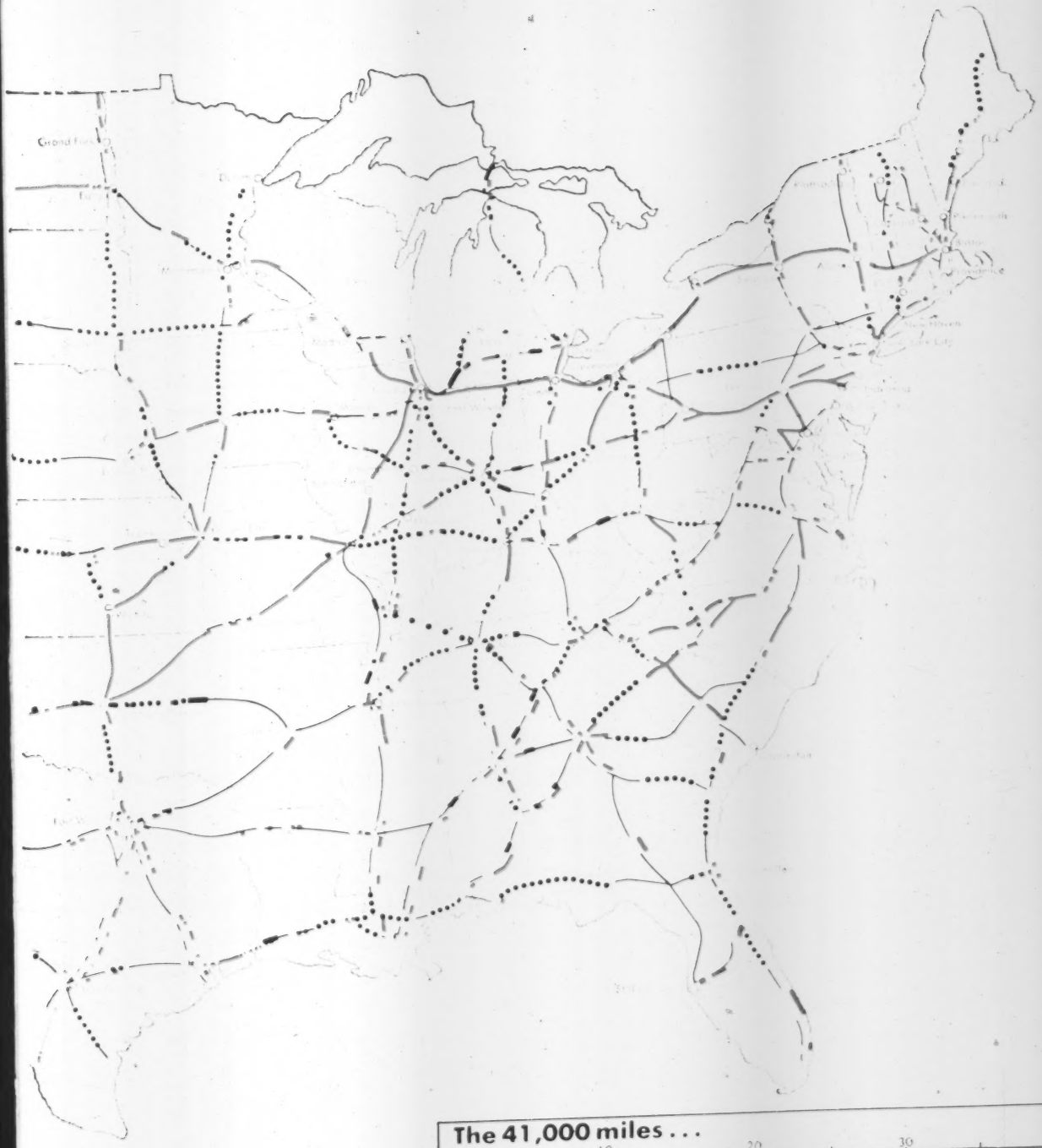
Here's the Picture on Interstate

Here's a quick look at how various stages of work are spotted on the 41,000-mile Interstate Highway System.

Main city-to-city routes are shown on the map. Because of scale limitations, belt routes, loops and spurs in urban areas are not drawn in. But the work done is included in the mileage figures.

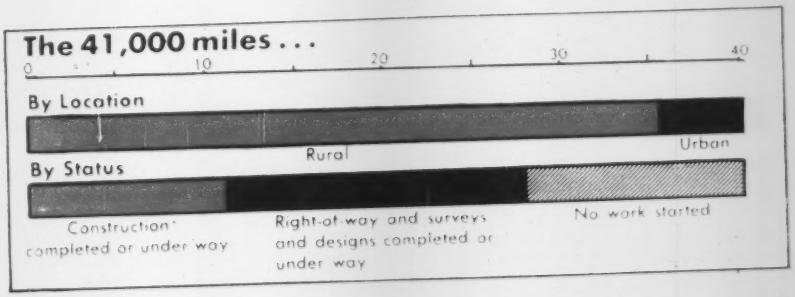
The 11,463.5 miles of construction completed or under way include 4,701.4 miles adequate for 1958 traffic, and open to traffic.

The map is ENGINEERING NEWS-RECORD's version of one put together by the U. S. Bureau of Public Roads.



Roads

BPR compiled its map from individual state maps prepared and submitted by the state highway departments at the end of 1958. Status of the system is as of December 31, 1958.



Cutting Steel Construction Costs

Research results will cut the costs of steel construction in the near future.

That good news was conveyed to more than 300 structural engineers and steel fabricators attending the 11th national engineering conference of the American Institute of Steel Construction in Birmingham, Ala.

Steel fabricators also offered some advice to designers—based on shop and field experience—pointing the way to lower costs.

The most imminent research development appears to be one leading to cheaper plate-girder construction. Tests at Lehigh University indicate thinner girder webs than now permitted by specifications can be used safely and that stiffeners can be made more economical.

Konrad Basler of Lehigh summarized the results of the tests, which probed the stability of girder webs beyond present specification limits (ratio of web depth to thickness of 170).

Girders with web depth-to-thickness ratios as high as 400 were tested in pure bending and pure shear. The webs tested in bending withstood seven times the critical load predicted by the accepted buckling theory. When failure occurred, it was not in the web but in the flange, by local torsional buckling.

Mr. Basler's explanation of this phenomenon is that after the web starts to buckle it ceases to carry additional bending stresses. Instead, the stresses are redistributed to the flanges. Thus the behavior of girders with deep, thin webs in bending depends more on the flange material than on the web geometry.

Similarly, shear tests indicated that stress redistribution occurs after the web starts to buckle. In this case, however, the plate girder acts much like a truss. The flanges serve as top and bottom chords, the stiffeners as verticals and the web between stiffeners as tension diagonals. Here, too, the accepted buckling theory underestimates the capacity of plate girders.

As a result of these tests, it seems certain that specifications will be revised to permit substantially higher depth-to-thickness ratios, with substantial saving in web steel.

The tests also shed light on stiffener behavior that could lead to less costly fabrication, Mr. Basler said. For one thing, a pair of stiffeners, one on each side of the web, may not be necessary. A single stiffener can be used, but it may have to be somewhat larger than either stiffener of a pair. It will serve adequately if it is designed to act as the vertical of a truss when the web buckles and to preserve the cross-sectional shape of the girder.

These tests also showed that stiffeners need not bear on the tension flange. Mr. Basler said a clearance equal to four times the web thickness could be used with safety.

However, the compression flange should bear against stiffeners. In fact, plain bearing may not be good enough; the stiffeners should be welded to the flange if buckling is to be prevented.

If these recommendations are adopted, savings will result not only because one stiffener can be used instead of two but also because of the elimination of the requirement for bearing at top and bottom of stiffeners. Fabrication will be much easier and girder costs will be cut by providing bearing at the compression flange only.

More research aimed at cost cutting is in the offing as the increase in research funds voted by the AISC board of directors last year are put to work.

W. R. Jackson, secretary-treasurer, Pittsburgh Des Moines Steel Co., Pittsburgh, and chairman of the AISC Committee on Steel Structures Research, foresees investigations into the possibilities of prestressed steel, orthotropic plate design in which a stiffened steel deck serves also as the flanges of bridge girders, plastic design of multistory structures, bond in composite construction, connection angles for light beams, rolled sections deeper than 36 in., perhaps up to 48 in., and lightweight sections of greater depth than now rolled.

These cost-cutting developments can't come too soon. Mace H. Bell, AISC chief of District Engineers, New York City, pointed out that supplies of structural shapes and plate and fabricator capacity are more than adequate to meet present needs. And competition from other materials is becoming increasingly severe.

Charles S. Matlock, senior designing engineer, Texas Highway Department Bridge Division, Austin, gave the conference some pointers on cutting costs of bridge construction. He said welding will be found most effective when used in combination with other types of fasteners. He cited as an example the Buffalo Bayou Bridge at Houston, a three-span (199-270-199-ft) continuous plate-girder structure, which was shop welded, but field spliced with bolts.

The fabricators viewpoint on how to produce more economical steel designs was presented by A. S. Marvin, vice president for engineering, American Bridge Division, U. S. Steel Corp., Pittsburgh, and E. L. Durkee, engineer of erection, Bethlehem Steel Co., Bethlehem, Pa. Though their talks were prepared independently, their recommendations were almost identical.

In brief, they urged designers to keep structures as simple as possible for erection. Don't tell fabricators what to do and also how to do it, they warned. Remember that the least-weight design may not be the most economical.

For example, girders designed for composite construction save steel but may cost more. They may be laterally unstable before erection, requiring falsework bracing until put in place, and they are difficult to handle, transport and erect. The shear connectors on the top flange are a hazard to the steel erectors in the field.

The fabricators contended that bridge designs calling for only two girders to support the deck may be more expensive than several girders when erection costs are taken into account. When two girders are used, they are heavy and require large-capacity erection equipment for putting only a small number of pieces in place.

Mr. Durkee also called wasteful the practice of some designers of requiring the reactions of continuous girders to be weighed. It does not provide useful information on the safety of the structure, but it does hold up the job, he said.

The national model building codes and some state codes will adopt AISC recommendations on plastic design before the end of the year, now that plastic design provisions are incorporated in AISC's specifications for structural steel design for buildings. That's the prediction of Edward R. Estes, Jr., AISC research engineer.

Mr. Estes also expects a rapid increase in the adoption of plastic design for single-story continuous framing as a result of the distribution of AISC's manual on plastic design.

AISC awarded its Lloyd Kimbrough Medal to Lief J. Sverdrup, partner in Sverdrup and Parcel, St. Louis. Mr. Sverdrup was cited for his contributions to the advancement of steel fabrication and construction.

School Board Raps Bidders With Bid-Shop Regulation

The low bid was among eight thrown out by the Vancouver, B. C., School Board last week. A new high school in Vancouver will be built by A. R. Grimwood Ltd. for $1,774,224—that's just $1,553 more than the discarded low bid.

Over the years, the School Board has requested bidders to list subcontractors' prices; leading contractors had always ignored the request, saying it was improper. This was the first time the School Board had enforced its regulation.

ICBM Bases

Builders will get contracts worth $300 million in '59

The Corps of Engineers will award $234.3 million worth of contracts in the next eight months for construction of intercontinental ballistic missile facilities.

Three contracts with a total value of $65.8 million have been awarded already this year.

Latest ICBM base contract to be awarded went last week to a five-firm joint venture for construction of $40.6-million facilities for nine Titan missiles at Lowry Air Force Base, Denver.

The Air Force recently announced plans to double the strength of the Lowry AFB Titan installation. The base is slated to house 18 of the 110-ton, 90-ft ICBM's in bombproof, underground silos. It will be this country's most powerful ICBM base.

The first Titan launching facilities at Lowry AFB will be built jointly by these firms: Olson Construction Co., Lincoln, Neb.; Morrison-Knudsen Co., Boise, Idaho; Johnson, Drake & Piper, Minneapolis, Minn.; and Paul Hardtman, Inc. and F. E. Young Construction Co. of Los Angeles.

More than 1,000 persons were present at the opening of the bids.

Lowry AFB will be the nation's first missile base to be built completely underground (ENR Feb. 19, p. 32). Additional Corps of Engineer contracts probably will bring the cost of the first increment to $77 million.

The two other ICBM installations that have gone under contract this year are the second Atlas unit at Francis E. Warren AFB, Cheyenne, and the first Atlas unit at Offut AFB, Neb. (ENR Mar. 19, p. 45).

Three others are at the bidding stage this month. Bids were scheduled to be opened this week on the first of three contracts for the first Atlas unit at Fairchild AFB, Spokane.

The second installation at Lowry AFB will be advertised before April 30. The first increment of the Atlas facility at Forbes AFB, Topeka, will be advertised for bids this month. The second and third increments will be advertised in May and June.

Two ICBM units will go out for bids in August—the Titan installation at Ellsworth AFB, Rapid City, S. D., and the first Atlas facility for Schilling AFB, Salina, Kan.

Lincoln AFB, Neb., will be the last of nine ICBM bases scheduled for contract this year. Bids will be invited in October for construction of Atlas launching sites there.

No ICBM is operational yet, the Atlas should be ready this summer.

Defense Centers Go Underground

The Pentagon will build all future SAGE air defense control installations underground.

Design work and construction planning have been halted on six bases scheduled to be built above ground. No contract cancellations are involved, because awards were not yet made on the six projects. But negotiations on at least one contract were almost completed when the freeze order was made.

SAGE (semi-automatic ground environment) is the Air Force's multi-billion-dollar system of electronic computers, communications lines and related facilities that will provide regional control over air defense.

Average construction cost for the surface-built SAGE buildings runs to $8 million per unit (less electronic equipment).

The decision to go underground will double construction costs. The fiscal 1960 military construction budget includes a $57.3-million fund for building the new installations.

The bulk of the system is still under construction. It will consist of a network of giant digital computers at 29 U.S. bases and two in Canada.

The SAGE system will pull the strings on defense against enemy attack. It will bring together and evaluate radar warnings and tracking, and direct the employment of fighter-interceptor planes and Nike and Bomarc missiles.

The new policy on underground construction stems from recent developments in electronic design. Advanced SAGE apparatus will use transistors instead of conventional vacuum tubes. This will result in a substantial reduction in the size of the computers.

The Pentagon says: "The most effective utilization of (the new) computer will be obtained by installing it in hardened (underground) facilities."

The new construction freeze affects SAGE facilities planned for Seymour Johnson AFB, N. C.; Webb AFB, Tex.; Ft. Knox, Ky.; Robbins AFB, Ga.; England AFB, La.; and Scott AFB, Ill.

Construction of the other SAGE installations is too far advanced to allow for any change. Buildings to house these computers are being built according to original plans, above the ground.

The Air Force would like to go beyond the presently planned 31 SAGE facilities. "When additional installations are authorized, they will be built underground.

The new policy on SAGE reflects the Air Force's intensified plan to build key facilities underground. Plans were recently approved to build a new Air Defense Command combat control center underground in Colorado. It will replace the existing surface installation near Colorado Springs (ENR Mar. 26, p. 19). This base coordinates operations of the regional SAGE centers.

The Air Force also plans to go underground with the last four Atlas ICBM bases. The first five are being built as conventional surface bases. All Titan ICBM launching facilities will be underground. The solid-fueled Minuteman ICBM, still in the early stages of development, will go underground.

. . . Scorecard for Defense Lines

Here's a rundown on the various U.S. air-defense lines that will be controlled by the SAGE bases:

• **DEW Line**—A string of 58 radar stations below the polar icecap running from Alaska to Canada's Baffin Island. It is now in operation after 32 months of construction work at cost of at least $400 million. Function is to detect unidentified aircraft flying over Arctic wastes. Line will be extended by construction of four Greenland stations.

• **Mid-Canada Line**—A chain of radar detection stations running some 600 miles south of the DEW Line in central Canada. This is to pick up tracks of invading aircraft and to plot courses for their interception and destruction.

• **Pinetree Line**—A chain of aircraft control and warning stations strung along both sides of the U.S.-Canadian border. This will pinpoint targets that break through outer defenses and direct destruction by aircraft and missiles.

• **Radar warning extensions at sea**—Naval and airborne radar warning extends the line from Newfoundland to the Azores in the east, from Alaska to Midway Island in the west. Also on station are patrols of additional radar picket vessels, radar blimps, and the "Texas towers" providing still more warning capacity and facilities to control interceptor aircraft.

• **BMEWS Line**—Construction of giant ballistic-missile early warning sites is under way in Alaska and Greenland. Each site will have surveillance radar to detect missile firings, and acquisition radar to track missile trajectories.

The operational aircraft radar warning facilities now feed into a system of regional control points. The SAGE sites now under construction will be the master control points for deployment of fighter-interceptor planes and Nike and Bomarc air defense missiles.

How Two Revolutions Are Affecting

1. In Iraq: Russia Buys a Big Role in

The $140-million Soviet loan to Iraq has purchased the Russians the right to sit in on Iraqi planning organizations, including a new Soviet-Iraqi Planning Board. There will be no place for Western consulting and contracting firms in the new setup.

The nine-year-old Iraq Development Board will be closed down, as will the Ministry of Development. Their functions will be divided among the other ministries in the government bureaucracy. These ministries will work closely with a central planning board in the Ministry of Economics.

Heading the Planning Board will be Ibrahim Kubba, the pro-Soviet Minister of Economics, who is now among the most influential members in the cabinet of Gen. Abdul Karim Kassim.

In addition to the Planning Board, Iraq's new ministries are: Oil, Industry, Housing & Public Works, and Agrarian Reform.

The Development Board was an autonomous agency that planned Iraq's long-range development and financed it with 70% of Iraq's oil royalties.

The board had one British and one American member on its ten-man executive body. British, American, French and Belgian experts were engaged to head or work in the five technical sections.

In the new setup, only Russians will sit on the Planning Board and Russian or satellite experts will be engaged by the various ministries. They will be appointed by the Soviet government.

Contracts for planning, design and execution will be exclusively with Soviet and satellite state concerns.

Almost all the Soviet loan will be channeled into light and medium industries—a new economic direction for Iraq, which had been using a large part of its oil money for dams and irrigation and drainage systems. Whether the new regime now intends to curtail these primarily agricultural programs is not known, although the government has been critical of agricultural development as doing little to improve the people's standard of living.

The loan agreement commits the Soviet Union to setting up 25 plants by providing all equipment and technicians. The Russians also agreed to implement 18 other projects in industry, agriculture, communications and transportation within seven years.

The agreement also calls for extensive geological and seismic surveys; oil, phosphate and sulfur explorations; hydrological studies and planning of two railroads.

Mohammed Salman Hassan, Secretary of the Development Board, has been critical of "unilateral projects" under the old regime because, he says, they gave no opportunity to "improve the quality of local labor and to train technicians."

He says the new arrangement insures the training of Iraqi technicians and unskilled workers. This is now possible, Mr. Hassan explains, because Russia provides the experts, equipment

2. In Cuba: Private Building Is Dead,

Three and one half months after the revolution, Cuba's once-healthy $60-million to $80-million-a-year private construction industry is virtually paralyzed. This creates a grave economic and political problem for the revolutionary government of Prime Minister Fidel Castro.

Only a handful of public works projects have been resumed or activated since the Castro regime came to power. Private building has been dead.

Paralysis of Cuba's second largest industry (the sugar industry is first) has idled 80,000 to 100,000 workers at a critical time in the nation's political history. The workers—increasingly restless—have appealed to the government for relief.

The crisis in construction adds significance to Prime Minister Castro's current visit to the U. S. He has already stated that he will ask for development loans from both private and public sources.

Since the earliest days of the revolution, the Castro regime has outlined grandiose plans for public works. But the outlook for private construction remains bleak.

A new rental law has effectively crushed private building. And the confiscation of 180 construction firms by revolutionary authorities has chopped a big hole out of the center of the industry.

The resulting uncertainty in construction circles is reflected in business at large and has increased speculation on the wisdom of the government's economic program.

What little optimism there is left for public works centers around a $100-million, low-cost housing program; a large and still nebulous scheme to drain the huge Cienaga de Sapata salt swamps in southern Matanzas Province; hospital construction; electrification and construction of feeder roads.

The government, however, must first overcome the effects of these obstacles:

- A sacked national treasury.
- Confusion in public offices caused by mass firings of employees accused of accepting favors and "botellas" (payment for bogus jobs) from the previous regime.
- Confiscation of property belonging to Batista collaborators.
- Temporary confiscation of some 236 companies—the majority of them construction firms—charged with receiving preferred treatment and government contracts from the previous regime.

The harsh rental law grew out of the Castro regime's unhappiness with the fact that almost all private construction investment—$50 million to $55 million annually—was going into high and medium-priced apartment buildings in Havana Province. Early last month the government cracked down on private builders with legislation chopping rents by 30% to 60% on all homes and apartment buildings constructed since 1939. It affected some 30,000 of the approximately 84,000 rental units in Havana alone.

But the government's theory that private investment funds would thus be channeled into the low-cost family housing program has backfired—for the moment at least. Private investors and property owners, badly hurt by the law, are sitting tight, not investing a dime in new buildings.

The rental law is the second step in Castro's "urban reform program," launched shortly after the revolutionary government took over early in January.

Construction

Planning, Westerners Out

and machinery. Iraq provides the unskilled manual labor and the capital.

Western observers, however, fail to see how the arrangement with the Russians differs in this respect from previous agreements with private Western firms or with the U. S. government on technical assistance aid.

Iraq also is speeding the departure of Western firms to make way for the Russians. Latest to go is Ebasco Services, Inc. of New York City, consulting engineers for the design and installation of a natural gas pipeline from the Iraq Petroleum Co.'s oilfields at Kirkuk to the Government Oil Refinery at Daura, near Baghdad. The government canceled Ebasco's contract because, it says, natural gas supplies to Baghdad homes and industry is not essential after all.

The Iraqi move swells the number of Western consultants and contractors whose contracts have been terminated since the Communists in the government, and especially in the Ministry of Economics, began a systematic drive to cut Iraq's economic ties with the West.

Among the American firms affected by Iraq's new policy are the Ralph M. Parsons Co. of Los Angeles, consultants for the drilling of water wells and construction of a sulfur recovery plant at Kirkuk, and Tippetts Abbett McCarthy Stratton of New York City, consultants for irrigation projects in central and southern Iraq since 1952. The government canceled its contract with both firms.

Iraqi authorities have also recently canceled contracts with MacKenzie Engineering Ltd. of London for planning on a 60,000-ton steel mill (ENR Apr. 16, p. 37) and with Ibeom, S. A., French consulting engineers, for a $10-million textile mill project.

Iraq officials said the British firm's contract was terminated because the steel mill will be planned and built by the Soviet Union under the recent agreement. MacKenzie has been asked to hand over all studies completed.

Public Works Drags

First step in this program was creation of the National Savings and Housing Institute, designed to manage the federal housing program and to supervise the reformed national lottery and Cuba's gambling casinos.

The third step, an urban lots bill, was enacted recently. It gives owners of vacant urban lots from two to five years to start construction of either homes or factories on the property, or to sell the lots at government-fixed prices to persons or companies that will.

The Castro program, though broad in scope, is slow in taking shape. At most, only a few thousand workers have been hired for the housing project in East Havana; only a handful of half-completed public works projects have been reactivated, most of them in the Havana area.

Besieged by growing complaints from unemployed construction workers in the past few weeks, Prime Minister Castro says: "It (the pickup in construction) is only a question of time. We have not been able to organize the construction machinery as fast as we would like. But it is a passing phase . . ."

When government bureaus and credit organization are fully organized and public works are in full swing, "then we will see if we don't have double the number of construction workers employed," he says.

How soon? All idle construction workers will be placed on jobs by the end of June, promises David Salvador, director of the Federation of Cuban Workers.

Public Works Minister Manuel Ray says the public works program will start immediately to absorb 10,000 new workers a month.

But businessmen predict even more acute trouble in the construction industry in the weeks just ahead. They doubt that public works can be stepped up rapidly. Their main question: Where is the money coming from?

To get an answer to that question is probably the major objective of Prime Minister Castro's visit in the U. S.

Although his 11-day tour is described as "unofficial" (he is here at the invitation of the American Society of Newspaper Editors), Prime Minister Castro's entourage includes the government's top economic officials and financial experts.

Soviet Hydropower

It's growing fast as ours, says General Itschner

The Soviets are making phenomenal gains in hydroelectric development, according to the U. S. Army's Chief of Engineers. Maj. Gen. Emerson C. Itschner told the National Military-Industrial Conference in Chicago this month that five Siberian plants will have a combined capacity half again as great as the total hydro capacity of all federal projects in the U. S.

The Russians are planning a power project on the Yenesey River in Siberia with a capacity of six million kilowatts, he said. This is greater than the combined capacity of power plants at all the dams the Corps of Engineers ever built, he stated.

The gigantic power and water development programs undertaken by the Sino-Soviet bloc stretch from the Danube to the Pacific, the general declared. In development or slated for it are the Danube, running from Germany and Austria through the Balkans to the Black Sea; the Vistula in Poland; the Dnieper and Don in the Ukraine; the Volga in Central Russia; the Ob, Lena, Yenesey, Angara and Amur in Siberia; and the Yellow and Yangtze Rivers in China.

Although the Sino-Soviet bloc is still far behind the U. S. in installed thermal and hydro capacity combined, its rate of increasing hydro capacity has just about caught up with ours, the general declared. It is very likely, he predicted, that the rate will exceed ours within the next five years unless ours is stepped up.

General Itschner pointed out, however, that the rate is a percentage of existing capacity. Therefore, with our higher present stage of development, we can expect to add more kilowatts per year than the Russians for some years to come.

Our present hydro capacity, he said, is about 30 million kilowatts. Russia itself has about 11 million kw, the Soviet bloc 15 million kw. U. S. thermal capacity totals 126 million kw, Russia's, 42 million kw and the Soviet bloc's, 67 million kw.

The USSR has ten hydro plants ranging from two to six million kw, General Itschner said. One is complete, three are under construction and six are in the planning or preparatory stages.

The USSR is progressing much faster than either its European or Asian satellites, General Itschner said. Large-scale plans for Eastern Europe are concerned chiefly with multi-national projects for the Danube, he stated. China is handicapped, he said, by lack of means to produce the equipment required.

How to Improve Earthmoving Equipment

Equipment makers with their ears to the ground may have felt some helpful reverberations out of an earthmoving conference at Peoria, Ill., last week. Users there spelled out what they would like, generally, and what they needed, specifically.

The two-day meeting was sponsored by the Central Illinois Section of the Society of Automotive Engineers. Most of the 1,700 persons who attended are connected in one way or another with the operation, design, development, manufacture, sales or service of earthmoving equipment.

Highlight of the conference was a panel discussion of the desired trends in earthmoving machinery. It dealt with wheel tractors, track-type tractors, off-highway trucks and motor graders.

• **Wheel tractors**—Wheeled tractors and scrapers must have greater availability—readiness to perform when needed—declared J. S. Armstrong, of J. D. Armstrong Co., Inc., Ames, Iowa. Other key points:

Many rigs are available to their user for only 60% of the time; anything over 75% is considered good. By comparison, crawler tractors have an availability factor of 94% to 96%.

"We contractors feel that much needed improvement must come from engineering research and field test operation so that wheel tractor-scraper units will have 100% availability when delivered for field operation."

The problem of accessibility in the units is not given enough consideration in design. Better accessibility to major components for servicing, repair and inspection would reduce maintenance costs and cut down time.

Transportability of these large scraper units is another goal that must be pursued. They must be designed and manufactured so that legal permit loads or segments can be transported from project to project.

Reliability of the manufacturer to stand behind his product was Mr. Armstrong's final point. He emphasized the need for standardization in sizes, tires, weights and other features so that the wheeled tractor-scrapers won't become outmoded or obsolete after five years of operation.

• **Crawler tractors**—In its competition with rubber-tired earthmoving equipment, the track-type tractor must be improved to give superior performance and versatility. Construction should be simplified and ruggedness increased, said J. M. Clark, of List and Clark Construction Co., Kansas City, Mo. Other key points:

The drive for fewer lubrication points and longer lubrication intervals should continue. Air-cleaning equipment also should receive more attention. And some engine oil filters do not seem to have enough capacity. Hydraulic systems can be further improved. Replacement of hoses is still a frequent occurrence.

Greater standardization of attachments is needed to permit interchange between similarly sized tractors of different makes.

"And finally," said Mr. Clark, "crawler tractors make too much noise." Reduction in noise would lessen operator fatigue, improve his efficiency and promote the safety of other workmen.

• **Off-highway trucks**—The three greatest needs in off-highway trucks are increased capacity, better performance and lower maintenance costs, stated L. J. Morgan, supervisor of mobile equipment for M. A. Hanna Co., Hibbing, Minn. Other key points:

Increased pay-load should be accomplished without greatly increasing the size of the truck or decreasing maneuverability or axle loadings. A freer use of today's and tomorrow's high-strength alloy steels would help solve these problems.

Lightweight expendable truck boxes might be used to lower the cost of moving material.

Higher horsepower, faster speeds, better maneuverability, faster dumping cycle would improve cycle-time.

Better truck tires that would require weekly instead of daily inflation checks would be a step forward.

Other improvements suggested include an air-cooled diesel engine capable of meeting the horsepower, performance, weight and size of present liquid-cooled engines.

• **Motor graders**—Motor graders are doing a wider range of jobs, and the specifications of these jobs are becoming more exacting.

That calls for continued improvement in this line of earthmoving equipment, said H. W. Hartmann, of McDougal-Hartmann Co., Peoria. New designs, however, must consider the ever-growing cost-price squeeze. Other key points:

A machine that is larger and more productive is not necessarily the most economical. It seems likely that motor grader size will stabilize around 30,000 lb and 150 to 190 hp.

Motor graders of the future must be easier to operate since good operators are becoming more difficult to get.

Around the World . . .

• **$20-million bell-ringer**—Bell Laboratories Co., AT&T's research subsidiary, will build a $20-million research and development center at Holmdel, N. J. Architect Eero Saarinen is preparing plans which should be ready for bidding sometime in October or November.

• **Pointed hints**—Some property-owners in Delaware County, Ohio, are suspected of scattering roofing nails on highways near construction sites to discourage the hauling of stones. Many of them are complaining that the heavily laden trucks are breaking down county and township roads.

• **Turnpike tunnels**—Pennsylvania's General Assembly will vote soon on a bill that would authorize the Turnpike Authority to build seven additional tunnels parallel to existing tubes on the Pittsburgh-Harrisburg section. Mountain tunnels now in use are only two lanes wide. They constitute bottlenecks for the four-lane tollroad.

• **Water study bill moves**—A proposed two-year study of U. S. water resources and hydropower got a unanimous blessing from the Senate Rules and Administration Committee last week. Okayed earlier by the Senate Interior Committee (ENR April 2, p. 23), the $200,000-plus plan looks like a sure bet for full-Senate approval.

• **Japanese Calder Hall**—British General Electric Co. is starting design of a 150,000-kw nuclear power station of the Calder Hall type for the Japan Atomic Power Generation Co.

• **T-1 steel penstock**—The first penstock in the U. S. to be made with T-1 steel will be installed at Southern California Edison's Mammoth Pool power project in the Sierras. At least the wye-branches of the power tube will be fabricated from the high-strength alloy, according to Lukens Steel. Up to now, Switzerland's Grande Dixence is probably the only hydro project with a T-1 penstock.

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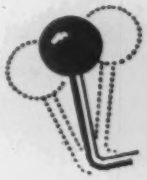
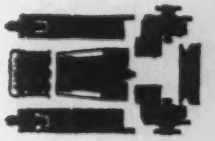
TWO MINUTE TRACTOR QUIZ

can be worth thousands of dollars to you...

	Yes	No	Don't know
	(check one)		
Do you usually prefer proof to propaganda?	☐	☐	☐
Are you open to facts . . . not fancies?	☐	☐	☐
Do you want a machine engineered for its job . . . not "adapted"?	☐	☐	☐
Do you want an 'automated' tractor, with no clutch pedal, that power-shifts?	☐	☐	☐
Do you want more work-output and less down-time?	☐	☐	☐
Is maximum visibility, as in an up-front position, important to the operator?	☐	☐	☐
Do you want custom-quality in every component . . . those you don't normally see as well as those you do?	☐	☐	☐
Do you agree that independent track operation means greater maneuverability and the ability to spin turn, fast and easy?	☐	☐	☐
Are you in favor of simplicity, as well as rugged design and engineering, in tractor transmissions and drives?	☐	☐	☐
Do you want a **modern** tractor, proven in use around the world?	☐	☐	☐
Be honest! Have you been "habit-buying" your tractors and tractor units?	☐	☐	☐





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- **Independent engineering unions suffer from chronic problems — apathy, lack of leadership and money, and disagreement over objectives.**
- **Now the problems are aggravated by a challenge from big labor. AFL-CIO leaders have pledged new efforts to organize engineers.**
- **But a recent Supreme Court ruling may vitally affect all organizing attempts by making things tougher for the non-professional unions.**
- **The independents and the AFL-CIO may meet head-on soon in a contest over New York City's municipal engineers. It looks like . . .**

Engineering Unionism Faces a

Engineering unions may be heading for a milestone in the near future—or a tombstone. They're moving toward what will probably be their toughest crisis since the controversy-filled days of 1952-53, when "unions for engineers" were debated at nearly every gathering of engineers.

The ability of engineering union leaders to meet this crisis may decide whether their unions become an important factor in engineering or die a slow death, leaving the field to the trade unions.

Three developments lie behind the approaching crisis:

• AFL-CIO union leaders earlier this year promised greater efforts to organize engineers and other white collar workers. The promises have been made before, but this time there's more at stake.

• The independent engineering unions have been plagued by squabbling. Engineers and Scientists of America, largest of the independents, split wide open just over a year ago on the question of including non-professionals in engineers' unions. It still hasn't recovered. Engineers and Scientists Guild, born out of the conflict, has yet to become a going concern.

• New interpretations of the Taft-Hartley Act's "professional provisions" may give the professional engineers' unions a break. This may come from a recent Supreme Court decision and a case now before the National Labor Relations Board.

1. AFL-CIO Sets Its Sights

Renewed AFL-CIO interest in engineers was evident at a conference on Labor and Science in a Changing World held in Washington D. C. in January by the AFL-CIO's Industrial Union Department.

"The AFL-CIO has fallen flat on its face in trying to organize engineers and scientists," stated Russell Stephens, president of the American Federation of Technical Engineers (AFL-CIO).

In any new AFL-CIO bid for engineers, warned an official of the electrical workers' union, "traditional union practices and concepts must be altered."

Why did trade union leaders spend two days discussing engineers and scientists?

There are two significant reasons.

• AFL-CIO leaders fear they may lose their potent voice unless they gain more clerical, technical and professional workers. Behind this lies the rapid change in America's labor force. Because of technological progress, the emphasis is shifting from blue collar to white collar workers, particularly engineers and others who consider themselves professionals.

• Trade union leaders generally now believe the growing number of engineers and scientists represents a fertile field for union organizing know-how and money. The present collection of independent engineering unions has not wiped out the alleged "exploitation" of employed engineers and scientists. These unions have suffered from disunity and lack of common purpose and direction.

Membership in engineering unions is about 57,000—about 51,000 are professionals. There are some 800,000 professional engineers in the country.

AFL-CIO unions have courted engineers in the past.

At the end of 1956, Walter Reuther, president of the United Auto Workers, announced a drive to bring "tens of thousands" of engineers into his union. The UAW set up the Aircraft and Avionics Council to give special consideration to the collective bargaining needs of technical employees.

The union changed its constitution in 1957 so that ". . . production workers, office workers, engineers and technicians could vote (separately) on matters which related exclusively to each group."

That same year the International Union of Electrical Workers also set up a technical council to woo engineers into the labor union movement.

The International Union of Operating Engineers has made several militant attempts to organize civil engineers. Its best results have come among employees of engineers engaged in field work. In Ohio and the San Francisco area, the operating engineers tried to force civil engineers into their union by threatening employers with a strike.

In an Ohio case, the engineer involved was transferred from field to office work. As a consequence, he was ruled a supervisor by the National Labor Relations Board and therefore, under the Taft-Hartley Act, not subject to union organizing attempts.

In the San Francisco case, the operating engineers threatened to strike

Time for Decision

against the general contractor to enforce a contract provision that restricted sub-contracts to firms with union personnel. The NLRB ruled this infringed upon the right of an employee to free choice of union representation.

The biggest AFL-CIO effort to organize engineers comes from the American Federation of Technical Engineers. The AFTE has more than 18,000 members, most of them clerks, draftsmen, technicians and other sub-professionals. The union's goal, so far as engineers are concerned, is to bring all engineers into the AFL-CIO as members of AFTE.

In 1956, AFTE sounded out Engineers and Scientists of America on a possible merger, but drew a polite "no." (ESA has also rejected several AFL-CIO offers to join as an autonomous union.)

Most of these sporadic attempts to bring professional engineers into the AFL-CIO have been unsuccessful. The only notable success occurred when the Engineers Association at Bosch Arma left ESA and affiliated with IUE.

Engineering unions shun the trade union movement for two principal reasons. First, most professional engineers are loathe to become identified with trade unionism, since they feel this endangers their professional status (ENR Mar. 26, p. 100). Second, they are afraid of being swamped by the non-professionals' greater numbers. In trade unions, they fear their special needs would be ignored in favor of the demands made by non-professional employees.

Leaders of independent engineers' unions throughout the country expect further organizing attempts from the trade unions, an ENR survey shows. But the independents plan little organizing action. Chief reason: Lack of money and organizing personnel.

Engineers working for the City of New York may be the next target of AFL-CIO efforts to organize engineers.

Last year Mayor Wagner issued an executive order permitting city employees to select a representative for collective bargaining, if they wished. Since then, the American Federation of State, County and Municipal Employees (AFL-CIO) has filed a petition for certification as legal bargaining unit for the city's 500 registered engineers. However, this group, like AFTE, is now primarily a union of clerks and technicians.

The New York State Society of Professional Engineers considered the drastic step of asking for certification as a bargaining agent, to give engineers the choice of a professional organization. When ESA indicated an intention to seek certification, such action by NYSSPE became unnecessary.

However, the state society has chartered a section to attract the New York engineers being eyed by the AFL-CIO. The section is intended to act as a "sounding board," with no collective bargaining powers.

The situation in New York City is significant because successful organizing attempts among that city's engineers could trigger similar efforts throughout the country. In fact, ESA is interested in municipal engineers in Detroit and Baltimore. These moves would particularly affect civil engineers, who form a major part of most municipal engineering staffs.

2. Why the Unions Are Quarreling

Increased pressure from the AFL-CIO, if it comes, will hit engineering unionism at a bad time.

ESA is still suffering from the major rift that occurred more than a year ago. The unions that left it are so split by differences that the Engineers and Scientists Guild, which they proposed to form, never got off the ground. The remaining independent unions are too small and too isolated to offer much competition to any serious AFL-CIO organizing drive.

The weakening of ESA began in April, 1957, when the national group expelled Engineers and Architects Association. EAA has six chapters in California, representing about 5,500 engineers and technicians.

The split was blamed on disagreement over allocation of dues. However, Joseph Amann, ESA president, points to "an EAA desire to control ESA" as one reason for the rupture that separated the two organizations.

A few months later a conflict arose over whether ESA was a sufficiently militant bargaining agency. Some affiliated unions, with both professional and nonprofessional members, accused the ESA leaders of seeking "super-professionalism" rather than active bargaining.

To subdue this opposition, ESA leaders pushed through a constitutional amendment limiting membership to professionals.

The result was a walk-out by all of the mixed units.

These units, together with EAA, met in Los Angeles in October, 1957, to discuss formation of another national federation of engineering unions. In February, 1958, in New York City, they set up a provisional organization called the Engineers and Scientists Guild.

The representatives elected temporary officers, headed by Charles Hull, president of the Engineers Association at Sperry Gyroscope Co., and wrote a provisional constitution.

These representatives were supposed to return to their respective unions to ratify membership in the new ESG. However, EAA refused to go along with the new group. Its leaders expressed doubt that their money would be well-spent. It is reported, however, that the conflict was a dispute over who would control the national organization.

As it now stands, none of the unions has ratified membership in ESG.

(*Continued on p. 33*)

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Men close to the engineering union movement now look upon ESG as little more than a paper organization.

However, there are dissenters from this view. They believe ESG, or a similar organization, could serve as the bellwether engineering unionism needs if it is to go anyplace. They believe ESA cannot provide this leadership so long as it insists on remaining purely professional, because the majority of engineering unions are mixed units.

A good many leaders of independent engineering unions looked to ESG with hope when it was first formed. **And some of them are still waiting for strong, aggressive leadership.**

If a dynamic leader does appear—one who can dispel petty differences and philosophical doubts and pull the numerous engineering unions together—the professional societies will have much more to worry about in their fight against engineering unionism.

ESA, which lost about 40% of its members in the split, was hurt further by two important NLRB election losses in the past two years. One occurred at Minneapolis-Honeywell Regulator Co. and the other at Pennsylvania Power and Light Co.

There are strong indications that a critical point is coming. The avowed intention of the AFL-CIO to organize engineers, added to the present groping of unionized engineers, leaves engineering unions few choices:

- Consolidate and adopt more aggressive, direct tactics or members may be forced to go to the trade unions for their collective bargaining needs.
- Maintain the status quo, which doesn't seem to promise a very bright future for the engineers' unions.
- Abandon all attempts to bargain for engineers and decertify, rather than join organized labor.

A leader of one of the biggest independent engineers' unions in the country said recently, "I foresee, beyond the immediate future, a time when all engineers will be in one union tied to the mainstream of organized labor."

Among those who expect a critical point in the engineering union movement is Joseph Amann, president of the ESA. He gives two reasons: "The effects of the Senate labor racketeering hearings and the rapid growth of professional and white collar workers will help hasten a transition in the labor union movement. I think consolidation will occur in both labor and engineering unionism."

Says William Cavanaugh, until recently of the Engineers Joint Council: "I think the engineering unions are regrouping for a new assault."

Others expect no change. "I see no basis for expecting a critical point," says Milton Lunch, union expert on the staff of the National Society of Professional Engineers.

But most leaders in the independent engineering union movement believe it is growing, albeit slowly.

Foremost obstacle to more rapid growth of engineering unions is the disagreement over three troublesome questions:

- **What is a professional engineer?**
- **Are professionalism and unionism compatible?**
- **Should professionals and nonprofessionals be lumped together in the same union?**

Definition of an engineer depends on whom you ask. Some independent unions define the professional engineer as one with an engineering degree. Others use the engineer's type of work to decide whether he is a professional. Still others use state registration as the criterion.

In judging whether employees deserve separate representation elections as professionals, the NLRB applies the definition given in the now-famous Section 2(12) of the Taft-Hartley Act (see next page).

Leaders of professional engineering unions, and the professional societies, are generally satisfied with the Taft-Hartley definition (see p. 35).

A chief reason most engineers haven't joined an engineering union is because they find it difficult to reconcile unionism and professionalism. The professional societies, spearheaded by NSPE and the American Society of Civil Engineers, have consistently maintained that when a professional engineer joins a collective bargaining unit he automatically compromises his professional standing. Spokesmen for engineers' unions refuse to concede this.

Union spokesmen, on the other hand, argue that the professional societies have failed to improve the economic status of engineers or win for them the recognition and prestige they deserve—implying that a union could do these things for them. This, society spokesmen won't concede.

A third issue in the engineering union picture arises over the separate representation of professional engineers. The problem is rooted in section 9(b)1 of the Taft-Hartley Act. This section gives professionals the right to a separate election from nonprofessionals in deciding whether they want a collective bargaining unit and, if so, which union shall represent them.

The professional societies and the unions limited to professional engineers are happy with this clause because it guarantees some protection to the wishes of professional engineers.

The AFL-CIO and some mixed engineering unions have attacked these provisions on the grounds that they show special consideration to certain workers. In practice, they find the provision hampers their organizing efforts. That's because it gives engineers the choice of refusing union membership or joining a professional union.

3. Taft-Hartley: The Engineers' Cop

No matter how the engineers' unions fare, professional engineers are protected by the Taft-Hartley Act from being organized against their will by the trade unions.

Administration of pertinent clauses has been disputed in two recent, and important, cases—Kyne vs. Leedom and Western Electric vs. the Council of Western Electric Professional Employees.

The NLRB's administration of the professional provisions in Taft-Hartley has been controversial. The board has tended to mix professionals with nonprofessionals in elections for a representative bargaining unit, when there are only a small number of one or the other.

In such cases, the engineers must clamor for their rights—often by legal action.

The Supreme Court in December rapped NLRB's knuckles for its interpretation of the law. That was an important victory for ESA on behalf of a member unit—the Buffalo section of the Westinghouse Engineers Association.

The Kyne-Leedom (Westinghouse) case arose when the NLRB commingled nine nonprofessionals with 233 professional engineers in the same bargaining unit at Westinghouse's Buffalo plant. The engineers, through ESA, sued the NLRB, charging the board violated the right to separate representation guaranteed them by Section 9(b)1.

The NLRB admitted violating the law, but argued that (1) so long as the unit is predominantly professional the rights of the professional are safeguarded and (2) to conduct investigations and separate elections in each certification case would place too heavy an administrative burden on the board. Furthermore, argued NLRB lawyers, the courts have no authority to review NLRB administrative decisions.

In upholding the decisions of two lower Federal Courts in favor of ESA, the Supreme Court, in effect:

- Opened every future case of this kind to possible judicial review.

(*Turn the page*)

• Upheld the right of professionals to separate representation.

• Made the organizing of future mixed engineering unions more difficult to accomplish.

As ordered by the Supreme Court, NLRB conducted a new election at the Westinghouse plant, limited strictly to professionals. The result was a 67% majority vote for Westinghouse Engineers Association-ESA; the earlier mixed election had given the union a 56% majority.

ESA claims the latest election result is proof that professional engineers prefer representation in a homogeneous unit.

A current case is more concerned with the definition of a professional employee (Section 2(12) of the Taft-Hartley Act).

The Council of Western Electric Professional Employees-National (ESA) and the Western Electric Co. have disputed the professional qualifications of some employees in the unit. The union says it wants to represent only professionals, but there is disagreement on the professional status of 508 employees involved.

After almost a year of formal hearings before the New York office of the NLRB, the company agreed to accept the union testimony as substantially descriptive of the disputed categories. The testimony, agreed Western Electric, may be used by the NLRB in deciding professional status. This agreement covers 409 of the involved employees.

The case is important because NLRB interpretation of Section 2(12) could be subjected to judicial review if the dispute is not settled.

According to Joseph Amann, "If the NLRB is forced to hold another election and CWEPE-N wins, it will be a major victory for the engineering unions." It will be significant, he says, because 1) the Bell system, one of the largest employers of engineers in the country, is desperately fighting it, and 2) CWEPE-N is the only nationally-certified engineering union and it's one of the most militant and best-organized.

4. How the Work Force Is Changing

The AFL-CIO's intention to organize engineers might be looked on as more bark than bite, but for one urgent fact. It must organize the growing white collar work force, particularly engineers, or shrink in importance.

Everett M. Kassalow, Research Director of the AFL-CIO's Industrial Union Department, says that "given the trends of recent years . . . the organization of white-collar workers takes on an almost life and death character for the American labor movement."

Facts like these back him up: In 1947 there were 23½ million blue collar workers, compared to 20 million white collar workers. In 1957, the white collar workers had surged ahead in numbers, 25.5 million to 25 million.

In those ten years, the professional and technical workers increased by 60.6%; clerical workers increased by 22.8%; while factory workers and laborers increased at a rate of only about 4%.

Or, to put it another way, the number of production workers has remained almost stable since 1947, rising only from 12.8 million to 12.9 million. But the number of non-production workers has increased almost 50% in that same period.

Biggest increase in the growing non-production group was among technicians and professionals. And within the professional group, the greatest growth was among engineers, scientists, and the like.

The trend is expected to continue. Estimates of the Bureau of Labor Statistics show that there will be three million more employees by 1965.

Trade union leaders are aware of this trend, and they've become increasingly troubled by it. Says Warren Woods, counsel for the United Papermakers and Paperworkers, "We must either take into (our present unions) in positions of influence and importance the professional, technical, clerical and other white-collar workers, or we must see to it that strong unions are created to organize them and throw behind their present weak unions the full force of our cooperation and our economic strength."

How the Labor Laws Affect Engineers

On July 5, 1935, Congress passed the National Labor Relations Act—popularly known as the Wagner Act—giving employees the right to unionize.

The Wagner Act did not differentiate between professional and nonprofessional employees. The result: professional engineers, and other professional employees were absorbed by the trade unions, with or without their consent.

The National Labor Relations Board made no attempt to give special consideration to professionals when certifying bargaining units. It regarded professionals as an indistinguishable part of the labor force.

In 1943, the American Society of Civil Engineers adopted a plan to protect professional engineers. The plan allowed local sections of the ASCE to take an initial step toward becoming a collective bargaining unit composed solely of professionals.

As such activity progressed, however, the local sections had to sever their connections with the bargaining units they fostered. NLRB would not certify these collective bargaining units because ASCE was composed of employers as well as employees.

Many of today's engineering unions were thus born as ASCE offshots.

In 1946, the 80th Congress began overhauling the Wagner Act. At this time the ASCE, and six other engineering societies, urged Congress to write protection for professional employees.

The specific recommendations of the seven societies laid the groundwork for the so-called "professional employee provisions" of the Labor Management Relations Act, 1947—commonly known as the Taft-Hartley Act.

Two clauses are particularly important to professional engineers:

Section 9(b)1 provides that: "The (National Labor Relations) Board shall not decide that any unit is appropriate for (collective bargaining) purposes if such unit includes both (professional and nonprofessional) employees unless a majority of such professional employees vote for inclusion in such a unit."

According to Section 2(12) the term "professional employee" means—"(a) any employee engaged in work (i) predominantly intellectual and varied in character as opposed to routine mental, manual, mechanical, or physical work; (ii) involving the consistent exercise of discretion and judgment in its performance; (iii) of such a character that the output produced or the result accomplished cannot be standardized in relation to a given period of time; (iv) requiring knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized intellectual instruction and study in an institution of higher learning or a hospital, as distinguished from a general academic education, or from an apprenticeship, or from training in the performance of routine mental, manual, or physical processes; or

"(b) any employee, who (i) has completed the courses of specialized intellectual instruction and study described in clause (iv) of paragraph (a), and (ii) is performing related work under the supervision of a professional person to qualify himself to become a professional employee as defined in paragraph (a)."

What the Engineering Union Leaders Say

Joseph Amann, president of the Engineers and Scientists of America, began his union career when he helped establish the Minneapolis Federation of Honeywell Engineers. In 1952, while president of the Federation, he played a role in founding the ESA. ESA is a federation of six independent professional engineers' unions with about 17,900 dues-paying members.

Mr. Amann has been an active lobbyist in Washington for the protection of the professional engineer in national labor legislation.

Here are his views on:

Taft-Hartley—"The professional provisions of the law are satisfactory, but we're not happy with the way the National Labor Relations Board interprets it. We use the Taft-Hartley definition of a professional for our own members."

Mixed unions—"Including nonprofessionals in the same unit with professional engineers makes it more difficult to organize the professionals. This is one reason why we have excluded nonprofessionals. The mixed unit is less effective in collective bargaining because of a diversity of aims."

Obstacles—"Engineering students are graduating with an anti-union attitude. They are given, in college, a management attitude and come out expecting a management position."

AFL-CIO competition—"Our chief competition, from the labor unions, comes from the electrical workers, operating engineers, auto workers and steelworkers."

Union strength—"I would guess 10% to 12% of all professional engineers are now unionized—about 70,000 of the 600,000 total."

Sounding boards—"I think sounding boards are illegitimate, company-kept groups that keep real unions out of the plant."

Russell M. Stephens, president of the American Federation of Technical Engineers (AFL-CIO), rose through the ranks of the AFTE to assume this office in 1952. AFTE claims a dues-paying membership of about 18,200—mostly draftsmen, clerks, technicians and other sub-professionals.

He has been one of the most ardent advocates of a merger between the engineering unions, particularly ESA, and the AFL-CIO trade union movement—through the AFTE. **Here are his views on:**

Obstacles—"The McLellan labor racketeering hearings have made it tougher to gain new members." (An ENR survey of leaders in independent engineering unions corroborates this. They agreed, almost unanimously, that the findings of the Senate labor hearings hurt engineering unions, as well as trade unionism.)

Also, "the National Society of Professional Engineers' campus contact with engineering students has poisoned their minds against unions. We must reach the student engineer before he becomes indoctrinated with an anti-union philosophy."

Competition—"Conflict of jurisdiction between labor unions, over engineers and scientists, could hurt AFL-CIO chances of success in this field."

Mixed unions—"The inclusion of nonprofessionals makes it easier to organize and more effective. We seek to discourage separation between our professional and nonprofessional members; for this reason we keep no separate membership figures on the two groups."

The future—"Eventually the vast majority of professional engineers will be unionized in the AFL-CIO. A merger of ESA and AFTE would hasten this."

Souding boards—"I don't think they're worth a damn."

Charles N. Hall, interim president of the Engineers and Scientists Guild, is also president of the Engineers Association at Sperry Gyroscope Co.

Mr. Hall has called a meeting of ESG's Steering Committee in San Diego for this weekend, when the fate of ESG may be decided.

Here are his views on:

Taft-Hartley—"The definition of a professional given in Section 2(12) is too loose; a more accurate one should be written. We feel also that representation elections held under Section 9(b)1 should be split into two parts, spaced some time apart. The first should be a vote on whether the engineers want a separate bargaining unit. The second should decide which unit they want to represent them."

Obstacles—"The biggest obstacle we meet in organizing is the inherent dislike engineers have for unionism and their inability to overcome it."

AFL-CIO—"I don't foresee any serious AFL-CIO attempt to organize engineers, not so long as its top leaders hold their present attitudes. However, I do think their attitudes are moving in the right direction, with their increasing recognition of the special needs of the engineer. Whether or not it's the AFL-CIO that organizes engineers is comparatively unimportant, so long as they do become union members."

Professional societies—"NSPE and the founder societies, plus . . . sounding board groups are so dominated by management that, when the interests of the engineer as an employee conflict with the interests of management, the employee is forgotten. . ."

The future—"The formation of a national engineering union organization is of paramount importance. I think that some day such a national would be part of the AFL-CIO, but this is of secondary importance."

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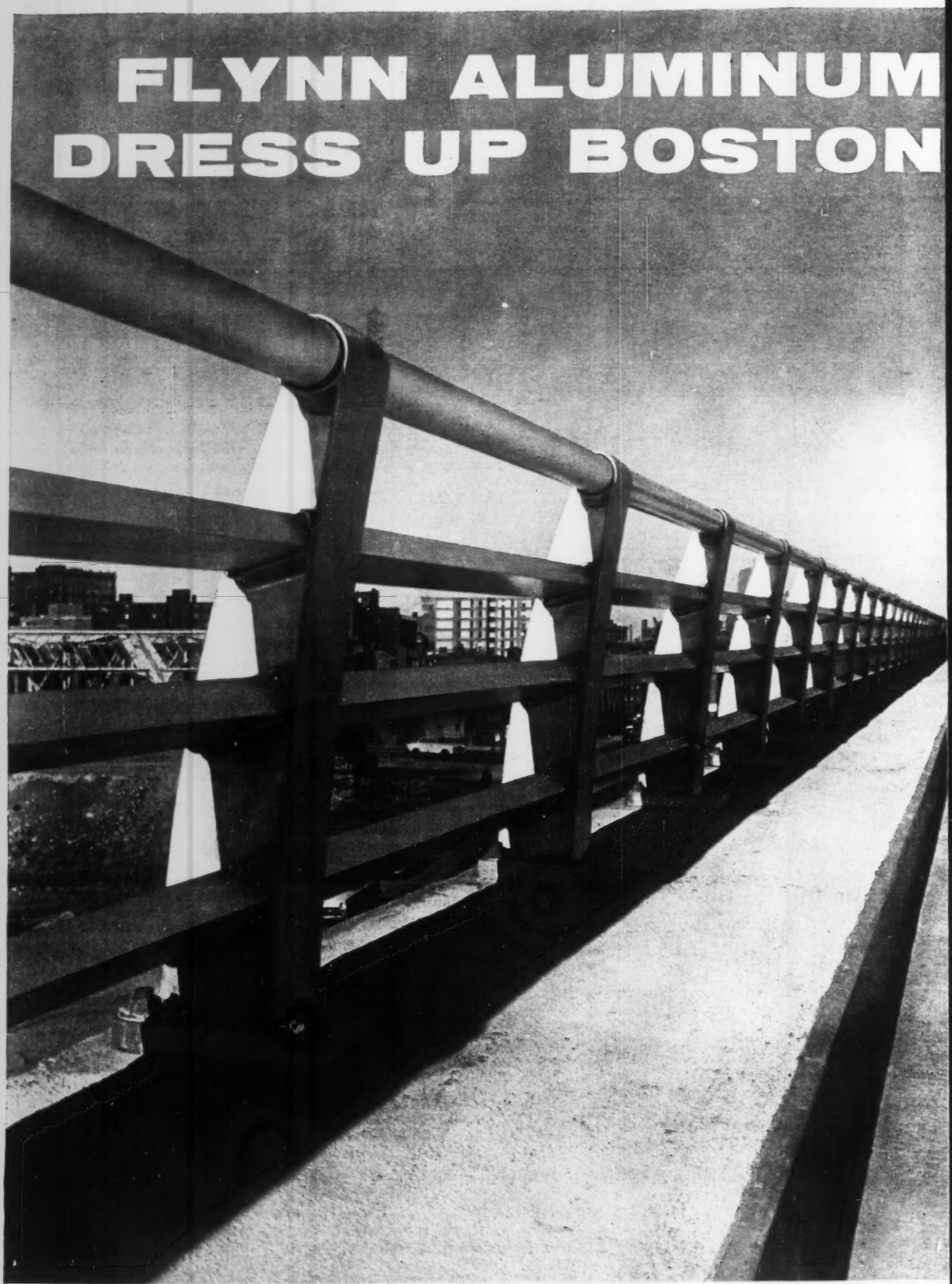

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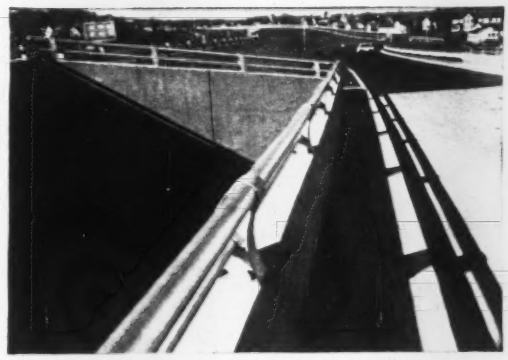

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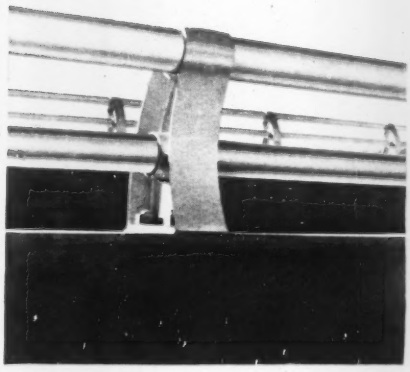

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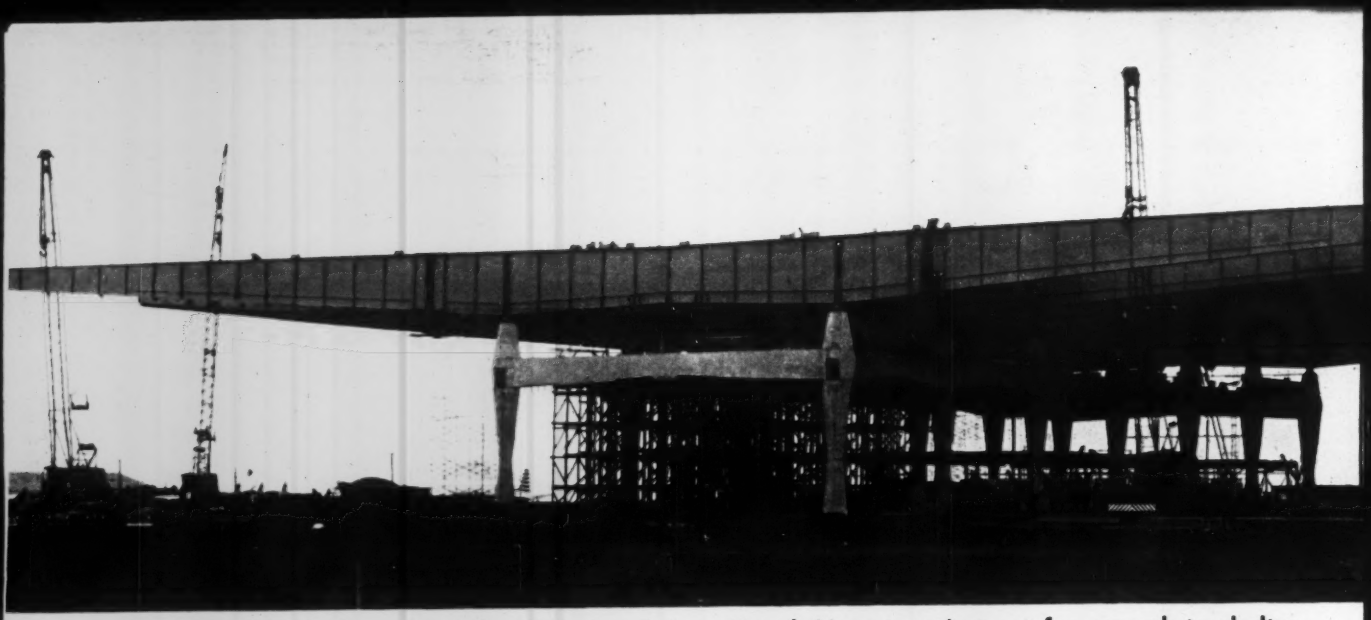
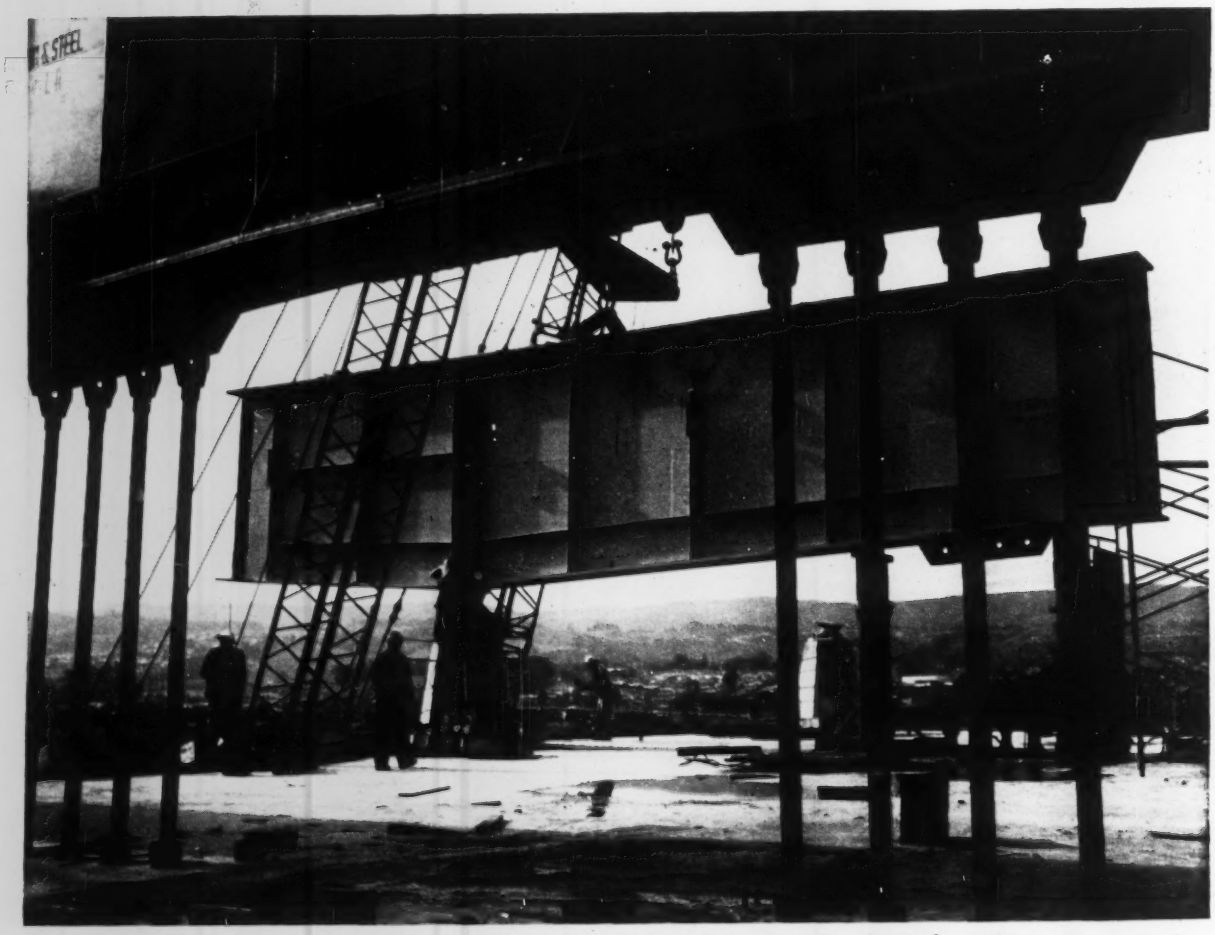


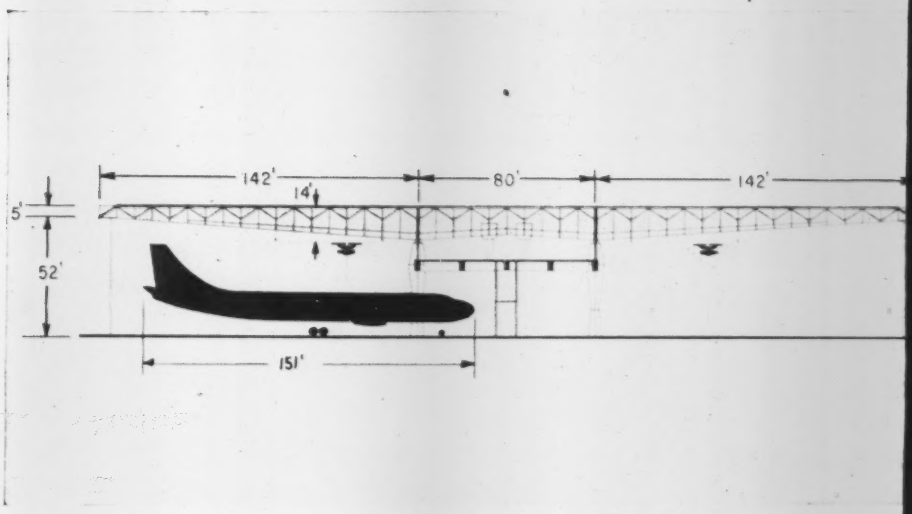
Roof girders in a hangar at San Francisco International Airport project out far enough to shelter

Big Jets Sheltered Under Long



Girder erection started with placing of two 62-ft lengths over the central section.

150-ft-long planes.



Huge plane fits under the roof with nose in central section.

Cantilever

A. A. Braccia
Chief of Construction
Skidmore, Owings & Merrill
San Francisco, Calif.

The jet service and maintenance hangar built for United Air Lines at San Francisco International Airport had to provide a larger unobstructed floor area than usual in hangars. It had to be big enough to house four DC8 planes simultaneously.

Weighing 300,000 lb apiece, these planes are 150 ft long, with a wing spread of 140 ft and tail height of 45 ft. Yet the designers were able to house four planes, plus shop and office facilities, in a hangar only 364x309 ft.

• **Double-cantilever hangar**—The large unobstructed floor area needed was obtained by using a double-cantilever design, with space for two planes on either side of a central two-story shop and office section. The roof over the maintenance and service space is supported on steel girders cantilevering 142 ft from the central section.

Since the planes are 150 ft long—8 ft longer than the cantilevers—something was needed to insure complete housing. The trick used was to provide nose pockets for the planes in the central section, which is 80 ft wide.

This double-cantilever design will permit expansion of the hangar in the future by increasing the length of the central section and adding more cantilever girders parallel to the existing ones.

(Turn the page)

120-ft cantilever arms were bolted to the center portion.

DOUBLE-CANTILEVER HANGAR displays its structural framing—long steel girders and tapered concrete columns—at its end walls.

• **Concrete service core**—While the roof is framed with structural steel, the central section of the hangar is reinforced concrete. Its concrete columns support the steel roof girders, which are continuous over the concrete service core.

The columns have an unusual shape. Their cross section was made to vary with the stresses. They are fixed at the base, restrained at the second floor, hinged to the steel girders at the top and have an inflection point about 12 ft above the base. The 42-ft high columns taper to a minimum section 12 ft above the base and widen to a maximum at the second floor.

Formwork for the columns was made of 2-in. planks set vertically and lined with pressed wood to produce a smooth finish.

Before fabricating the final forms, the contractor made a full-scale mockup of the column and girder intersection. The mockup gave foremen and mechanics a three-dimensional picture of what was to be built and proved helpful in checking all angular cuts.

Columns were concreted in four lifts: (1) the first 12 ft, to the neck, with two sets of forms being used for the 14 columns in the hangar; (2) the next 16 ft to the bottom of the second-floor concrete girders, with four sets of forms; (3) up to the top of the second floor, at the same time as that floor and its framing; and (4) the stub above the second floor, with two sets of forms.

Because of the heavy concentration of reinforcing and the fact that the forms for the first and fourth lifts were bigger at the bottom than at the top, both internal and external vibration was necessary to position the concrete. A plasticizing admixture was used in the mix to obtain an easily placed concrete with 4½ to 5-in. slump.

The same mix was used in beam bottoms, where reinforcing was heavily concentrated. Concrete with 3 to 3½-in. slump, without the admixture, was placed in the rest of the beam and second floor.

• **Roof framing**—Principal supports for the roof of the hangar are seven 364-ft-long welded plate girders supported on rocker bearings atop the concrete columns. The girders are spaced 51 ft, 6 in. apart. Between them span triangular space trusses, which in turn carry steel purlins and a light-gage metal deck.

The girders taper from a depth of 14 ft over the supports to 5 ft at the ends of the cantilevers. Flange size ranges from 15x⅝ in. to 36x2 in. Webs vary from ½ to ¾ in. in thickness.

Each girder was fabricated in six sections. Four of these required a horizontal web splice because of the depth. These splices were made in the shop. More than 6,000 lin ft of fillet welds were applied to each girder in the shop.

Electrodes and fluxes were selected for use with web and flange materials of different types (ASTM A7 and A373). Bevels and back gouging were employed to insure 100% penetration of welds.

Electrode type L-61 was selected, to control porosity, improve bead appearance and make slag removal easy. Lincoln Electric's type 840 flux, especially suited for multiple-pass welds in deep bevels, was chosen because of rapid set and easy removal.

Web-to-flange welds were made automatically with submerged arc, and stiffeners were hand welded.

At the site, the two girders spanning the central section at each end of the hangar were erected first. They were assembled on the ground by welding together two 62-ft sections to form a 124-ft unit, which was set in place by crane. The other five girders over the central core were raised in two pieces. Supported on shores, the two sections were connected in place with splice plates and high-strength bolts.

The space trusses, 5 ft deep, carry the roof deck, stiffen the structure horizontally and brace the girders against twisting in a vertical plane. The roof is 20-ga steel decking, topped with 1 in. of insulation board and builtup roofing.

• **Down below**—Floors in the hangar areas are 15-in. concrete slabs. They were given a hard finish. Steel pipes were incorporated to circulate hot water for panel heating.

The building is supported on 600 cast-in-place, step-tapered concrete piles driven to firm bearing with a 32,500-ft-lb single-acting steam hammer. They were designed for 70-ton loading. While a load test was being conducted on an 88-ft pile carrying 60 tons, an "uncalled-for" earthquake (5.5 on the Richter scale) occurred (ENR April 25, 1957, p. 32). Aftershocks (up to 3 on the scale) were registered while the 140-ton maximum load was on the pile. Nevertheless, the dynamic forces produced no noticeable effect on it.

Skidmore, Owings & Merrill were architects-engineers, with Myron Goldsmith in charge of the structural design. H. J. Brunnier and Prof. Boris Bresler, University of California, were structural consultants, the latter for stability problems of the plate girders. Charles H. Lee was foundation consultant. All are located in San Francisco.

Pacific Iron and Steel Corp., Los Angeles, fabricated and erected the structural steel. Dinwiddie Construction Co., San Francisco, was general contractor.

"Traffic-go-round" Texas-style!

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Just imagine designing this four-level interchange in a construction material other than reinforced concrete. Texas highway engineers found reinforced concrete the logical, economical solution. Here the design called for a direct-connect interchange in a restricted right-of-way. They chose the shallowest possible construction . . . continuous reinforced concrete slab. This provided guaranteed minimum over-all height with the required vertical clearance for the lower roadway levels. The design flexibility of reinforced concrete also simplified the forming problems for fitting curves and varying elevations with no complicated shop details. On your next bridge or multiple overpass, design for beauty plus economy . . . and stay on schedule with reinforced concrete.

CONCRETE REINFORCING STEEL INSTITUTE

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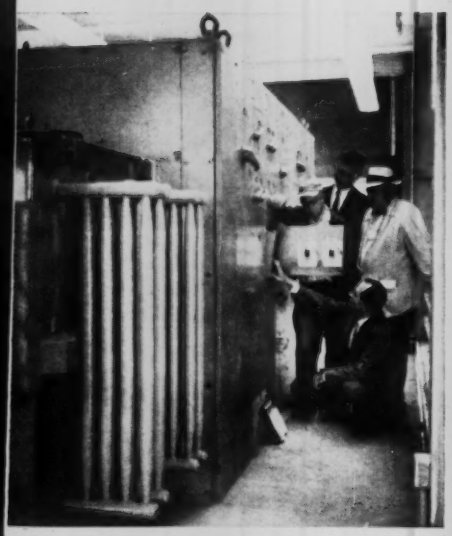
Designer: Bridge Section, Fort Worth District, Texas Highway Department
Contractors: Austin Bridge Company, Dallas, and Worth Construction Company, Fort Worth

View from pump floor in Oswego, New York, pumping station showing one of main pumps being driven by Westinghouse 300-hp vertical synchronous motor above.



Robert B. Stannard, Resident Engineer for Nussbaumer, Clarke and Velzy, Consulting Engineers; Karr Parker, Jr., Buffalo Electric Co.; Kenneth D. Jensen, Superintendent, Department of Water, Oswego; and M. B. Trimble, Westinghouse Construction Sales Engineer, discuss "tilt-out, lock-out" feature of the control center. Westinghouse double-ended control power center has 300-kva Inerteen® transformer at each end.

Oswego water pumping station Powers-Up to attract new industries

The modernization and expansion program of the Department of Water, Oswego, N. Y., provides an interesting example of building today for tomorrow's needs. While planning for today, Oswego's Water Board recognized that a good water supply is an indispensable commodity in attracting new industry to the area. By Powering-Up electrically, their new pumping station has electrical capacity five times present demand to allow for future growth.

Present demands for water are approximately 10 million gallons per day. Installed pumping capacity is capable of providing more than 20 million gallons per day. In addition, provision has been made to increase capacity to 35 million gallons per day when required by future demands.

The new pumping station is supplied with lake water from an intake tunnel which extends through solid rock for a distance of 6250 feet into Lake Ontario. This tunnel intake averages eight feet in diameter and is capable of conveying 128 million gallons of water per day.

Electrical power for the station is available from two separate sources—one direct from the Oswego Steam Station and the other from the Niagara-Mohawk Varick Station. The complete electric distribution system, as furnished by Westinghouse, provides for all anticipated future expansion of the pumping station.

Powering-Up electrically for future growth can offer important advantages to you. For further information, call the Westinghouse electrical engineer nearest you, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-94119

Owner: Department of Water, Oswego, N. Y.
Consulting Engineers:
Nussbaumer, Clarke and Velzy
General Contractor: McElwee-Courbis Const. Co.
Electrical Subcontractor: Snyder and Mackin, Inc.
Westinghouse Distributor: Buffalo Electric Co., Inc.

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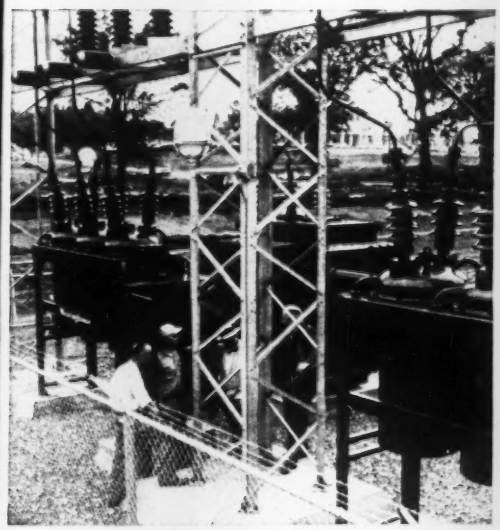
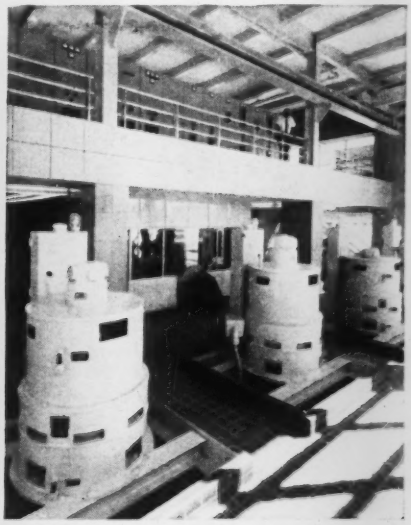


Leo J. Landrigan, Superintendent, Oswego Pumping Station; Richard C. Mansfield, Foreman for Snyder and Mackin, Electrical Contractors; Kenneth D. Jensen; and Charles T. Hansen, Westinghouse Sales Engineer, at outdoor substation which serves new Oswego pumping facility. Two Westinghouse 2000-kva power transformers and two Westinghouse 34.5-kv oil circuit breakers are included in this substation.



Main floor view in pumping station shows four Westinghouse vertical synchronous pump motors with the glass enclosed control room in background. The mezzanine floor above is occupied by Westinghouse 2300-v, heavy-duty, metal-clad switchgear, using Type DH air circuit breakers.

Another view of main floor shows reverse side of control room and, on the mezzanine, Westinghouse double-ended control power center. Floor openings in foreground, not shown, have been provided for the installation of four additional raw water pumping units when filter plant is added.

This tiny drawbridge (arrow) won't hold up Corpus Christi traffic much longer . . .

A Bridge for Growth in Corpus

Corpus Christi business district fronts on a seawall-protected esplanade.

It's being replaced by this high-level arched cantilever span.

Christi

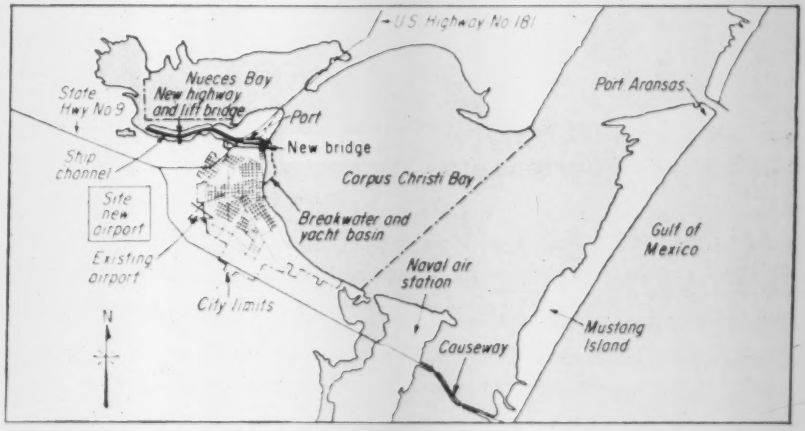
Completion of a new high-level bridge at Corpus Christi, Tex., late this year is eagerly awaited by the citizens of that Gulf Coast city as a signal for a new spurt in growth.

Already they claim—and believe—Corpus Christi is Texas' fastest growing city, the nation's last industrial frontier and the country's coming capital of seaside recreation. They arrive at this optimistic view not only by counting their natural assets but by recalling previous significant developments—most of them involving construction like the new bridge—that brought upsurges in city growth.

During the past three decades Corpus Christi's population has doubled every ten years to reach its present 180,000. And on this growth path have been the following significant milestones:

- 1926—First port facilities built.
- 1930—Gas and oil well development begun nearby.
- 1935—Mathis water supply dam completed on the Nueces River after an inglorious start in 1930, when the first dam (La Fruta) failed.
- 1940—Seawall and esplanade built along the waterfront.
- 1941—Navy established its largest air training station.
- 1953—The city adopted a comprehensive area development plan.
- 1956—A new water treatment plant was completed to supplement an existing plant and raise treatment capacity to 81 mgd.
- 1958—The Wesley Seale Dam was completed to drown out the existing Mathis Dam and increases the city's impounded water supply ten times.

It is to these milestones and the developments they represent that Corpus Christi attributes its growth. During the three decades covered, industrial development has boomed to the point where $350 million annually is added to the local economy. Port tonnage has increased from nothing to over 25 million tons a year, to rank the city ninth in the nation in this field. And tourist spending in the city has risen to a yearly total of $20 million. That's considered only a start since two causeways now give access to the



NEW BRIDGE will be a key connection to the city's port, island beaches and airport and to the U. S. Naval Air Station.

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Seawall and esplanade lead to the bridge and port entrance

undeveloped recreation area in the city's frontyard on the barrier beaches of Mustang and Padre Islands, which extend for over 100 miles up and down the coast.

Currently under construction, too, is an entirely new airport to replace the existing outmoded facilities.

Now to add to these developments, and to provide a springboard for a new era of growth, the high-level bridge is being erected. Envisioned as Corpus Christi's next significant milestone, its completion this year across the entrance to the city's port will permit removal of a narrow, low-level bascule which has restricted the channel to a width of 94 ft and has also been the cause of continuous traffic jams on the city's main highway route to the north. Corollary construction operations, already underway, involve deepening the harbor ship channel to 42 ft and widening the port entrance to 400 ft.

The port entrance bridge is a cantilever truss structure with anchor spans of 310 ft and a main span of 620 ft, providing a 140-ft vertical shipping clearance and a horizontal clearance of 400 ft.

A feature of the bridge is that the cantilever arms of the main span carry a 400-ft suspended tied arch as the center portion of the structure. This arrangement was effected by designing the bridge as a fully continuous truss for cantilever erection, and then making provision to "idle" some of the members after erection in order to suspend the central portion as a tied arch.

The bridge has these other distinguishing characteristics: the deck is 82 ft wide, accommodating two 36-ft roadways, a 4-ft median strip and two 3-ft sidewalks; and the lower chords of the anchor spans and of the main span are curved downward to meet on the main shoes at near ground level.

This latter arrangement eliminated the need for costly, high piers and aided in wind resistance. The wind loads are brought down through the truss members, and a minimum surface is presented to the wind, which is figured at 60 lb per sq ft of exposed surface, corresponding to a wind velocity of 110 mph.

Approaches bring the total length of the bridge to 5,862 ft. The span adjacent to the main bridge anchor arms at either end is a 272-ft deck truss. This is followed in the south approach, which is on a curve, by six 150-ft and two 90-ft simple plate girder spans. The north approach, which is straight, consists of a 600-ft and a 300-ft continuous plate girder unit. The girders range in depth up to 84 in. They are of welded fabrication, including all field splices.

Beyond the plate girders, the approaches consist of 70- 60- and 40-ft prestressed concrete girder spans. Prestressed I-section concrete girders in

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. . . Lower maintenance cost

these span lengths were found to cost about the same as rolled steel I-sections, but were adopted on the premise that maintenance costs would be less than for painted steel in the prevailing corrosive atmosphere. The concrete girders were precast and post-tensioned, using 5,000 lb concrete.

The main truss bridge is characterized by heavy built-up riveted members. For the tied arch portion of the center span, chords are box-shaped members 18 in. wide and 24 in. deep. In the cantilever arms and the anchor spans they are 22 in. wide and 28 in. deep. The steel cross-section of the largest chord is 150 sq in.

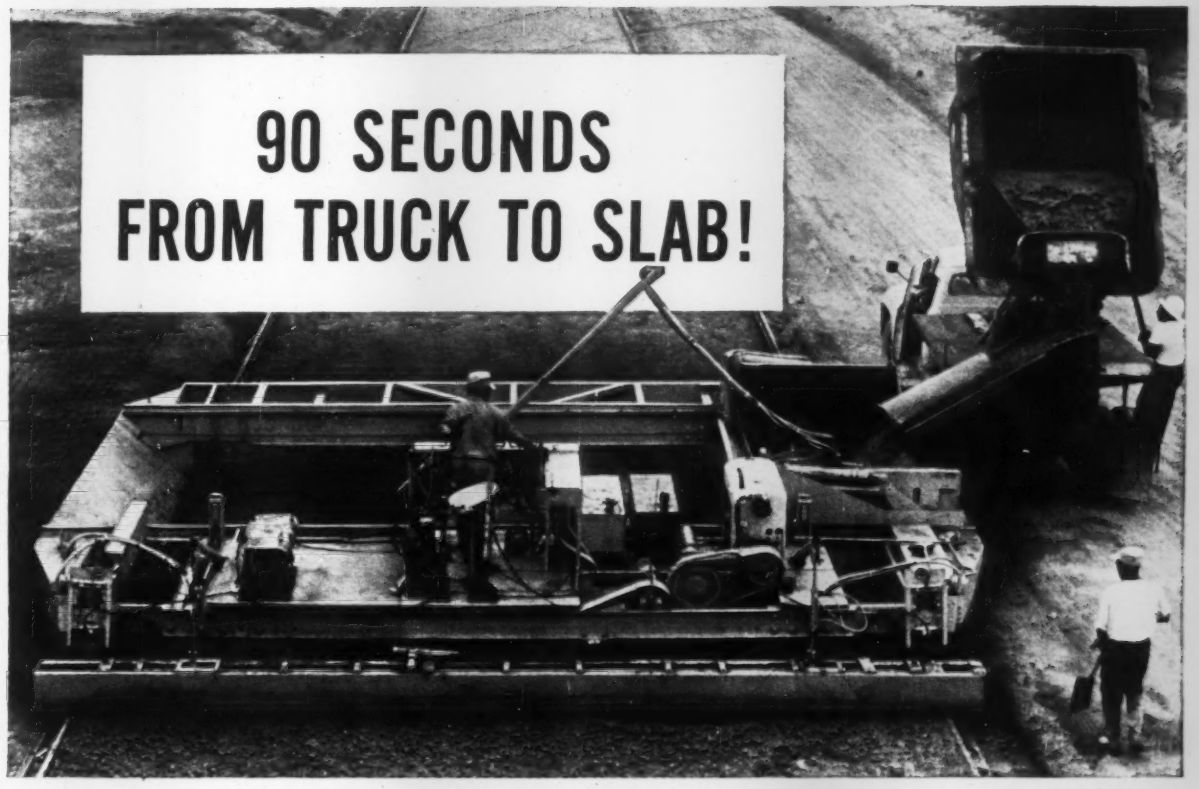
All foundations are on 17 in. square prestressed concrete piles driven to bearing in dense sands or sand-shell formations. The longest ones are 90 ft, and the design calls for working loads of 50 tons per pile.

Steel erection is nearly complete, closure having been made at the center in March. While the main span was being cantilevered from both ends, the anchor span trusses were tied down to the piers to safeguard against any overbalancing of the cantilever arms. Closure of the main span at the center was on a pin; jacks located at the main shoes permitted moving the arms horizontally, while other jacks on top of the piers at the ends of the anchor arms furnished the necessary vertical adjustment.

Erection was carried out by travelers erected on the floorbeams of the anchor spans and progressing forward on the floor system to the lower chord of the tied arch. Steel was lifted from the ground by a stiffleg crane on the anchor spans and moved to the travelers on work cars with flanged rubber wheels riding on the stringers.

The steel superstructure contract was carried out by the American Bridge Division of U.S. Steel. J. A. Raines Construction Co., Muskogee, Okla., placed the lightweight concrete deck and the railing. The substructure for the steel spans was built by Guy James Construction Co., Oklahoma City, Okla., and the prestressed spans by Cage Brothers, San Antonio, and Ross Anglin Construction Co., Austin.

The bridge was designed by the bridge division of the Texas State Highway Department, D. C. Greer, state highway engineer. The design of the main span was checked by Howard, Needles, Tammen and Bergendoff, consulting engineers, Kansas City, Mo. Construction is under the supervision of Randle B. Alexander, bridge engineer of the highway department, with Lewis White as project engineer. Total cost of the bridge will be $9,053,523 when it is opened to traffic in November.



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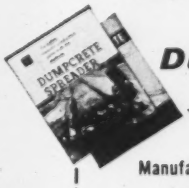
Get full details now. Find out how the complete Dumpcrete method can help you speed work, cut costs and maintain quality on your next paving job. Send the coupon today for new catalogs—or call your Dumpcrete distributor.

Send for this new  ***Dumpcrete Literature***

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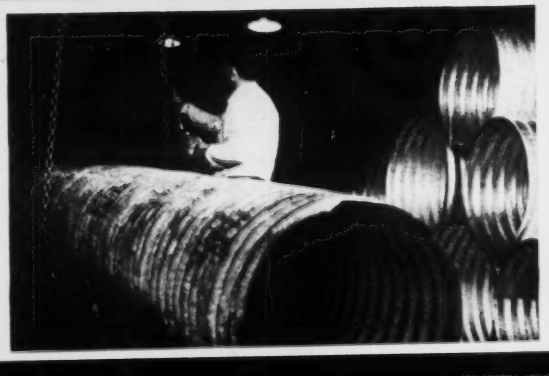

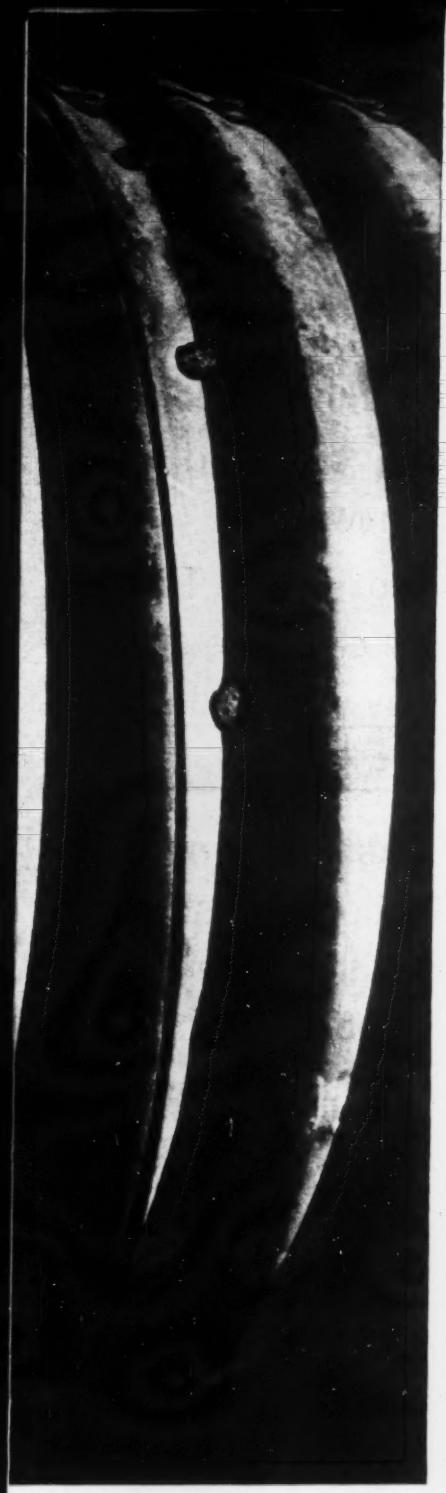

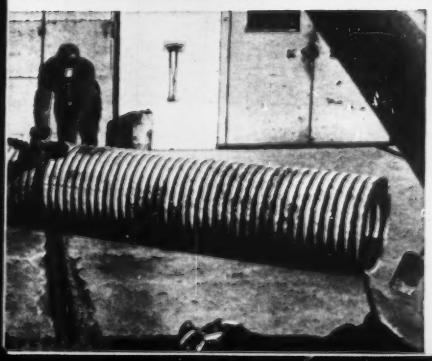

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The stencil on the corrugated metal was perfectly legible. U. S. Steel checked the heat number stenciled on the metal and found that the steel was made in 1918! The pipe was fabricated by the Nebraska and Iowa Steel Tank Company, now known as the Eaton Metal Products Corp. The culvert sheets were made by the American Sheet and Tin Plate Company, then a subsidiary and now part of U. S. Steel.

The pipe is two feet in diameter and 16 feet long. The steel was not corroded because the corrugated metal was protected by a coat of zinc. It wasn't crushed or cracked because corrugated metal pipe is *flexible*—it deflects under load and gains support from the compressed soil around it. This is why only corrugated metal pipe can stand the crushing weight of deep fill *and* the vibration and impact of heavy loads over shallow fill.

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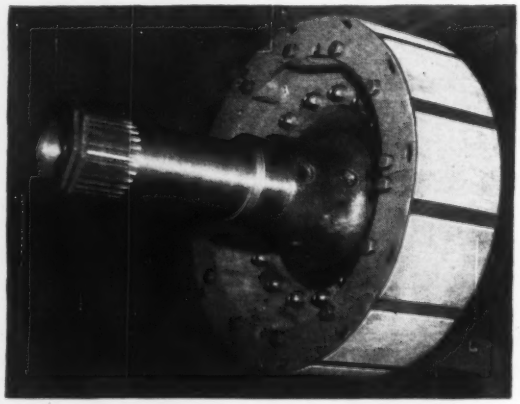
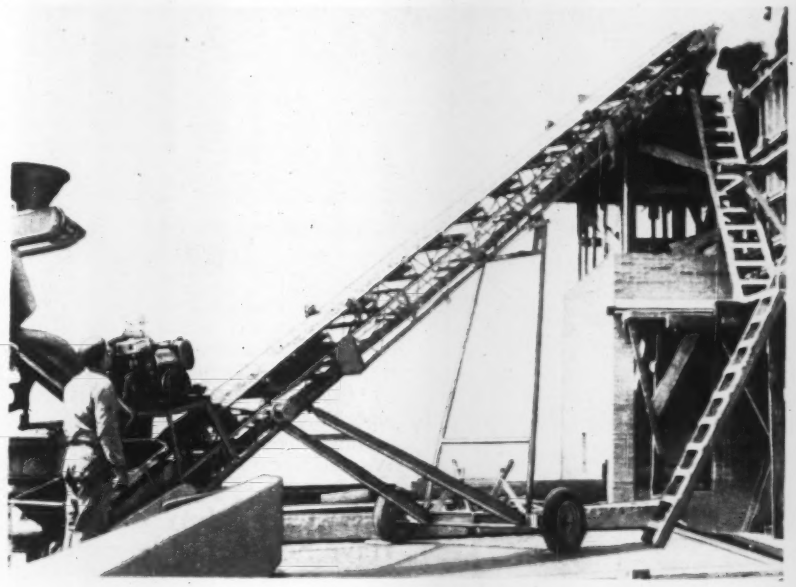
Full circle stopping power provides constant lining pressure, resists fade. Brakes require no lubrication, adjust themselves automatically. Operators work faster—with greater safety—even on terrain once considered unsafe. And B. F. Goodrich Hi-Torque Brakes are the only brakes with reserve power to handle those giant wheeled vehicles still on the drawing boards.

If B. F. Goodrich Hi-Torque Brakes are still new to you, now's the time to ask your equipment manufacturer for facts or contact B. F. Goodrich Aviation Products, a division of The B. F. Goodrich Company, Dept. EN-49A, Troy, Ohio.



B.F.Goodrich ***Hi-Torque brakes***



Conveyor Cuts Placing Time

The "Faircrete," a new conveyor, will cut the tedious, costly process of placing concrete in half, according to its manufacturer.

The unit is a 40-ft conveyor that can handle 40 cu yd of concrete per hour up to a maximum height of 26 ft. Power for the conveyor is supplied by a 12.5-hp Kohler gas engine. FAIRFIELD ENGINEERING CO., MARION, OHIO.

International Unveils 'B-Line'

A heavy-duty, six-wheel dump truck with a rated maximum gross weight of 50,000 lb is one of a new line of International trucks. It is powered by a standard six-cylinder, 141-hp engine or a new optional 193-hp, V-8 motor.

The new line of trucks, the "B-Line", ranges in gross vehicle weights from 4,200 lb to 33,000 lb. Models include pickups of 4,200 to 5,800 lb GVW powered by a 141-hp, 6-cylinder engine or an optional 155-hp, V-8 engine.

The new line also includes light and medium-duty models with factory-installed panel, service-utility, dump, platform and stake bodies. There are also station-wagon-type vehicles that can seat eight persons or carry half-ton loads.

Nine International 6-cylinder valve-in-head engines, with 113- to 154-hp ratings are available with the B-Line trucks. Five of these engines are gasoline-fueled, and four are offered with factory-installed liquid-petroleum-gas systems.

Three new V-8 engines, available as optional equipment, have ratings of 155 hp, 193 hp and 197 hp. INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO, ILL.

D7 Tractor Gets Turbocharged Engine

The D-7 tractor has become the third crawler in the Caterpillar line to be powered with a turbocharged engine. In this respect it joins the D 9 and D 8 tractors.

The modified D 7 now has an engine that develops 140 flywheel horsepower as opposed to the 128 hp rating of preceding models. The drawbar horsepower is now 112 as opposed to the former 102.

The new model D 7 also incorporates many other recent Caterpillar improvements. These include dry type air cleaner, lifetime lubricated rollers, carrier rollers, and idlers, full flow filtra-

4-D

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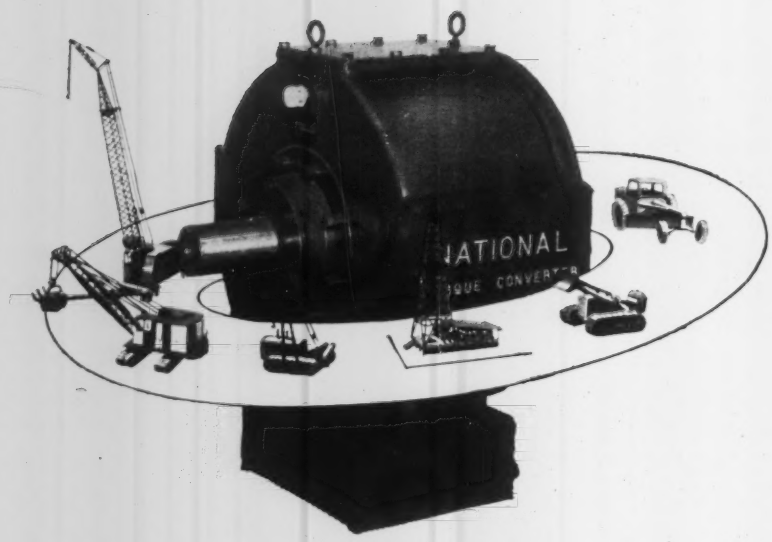


A star performer

where top performance is needed

National Torque Converters are designed to help your equipment provide top performance where top performance is required . . . in strip mining, mechanized mining, drilling, earth moving, road building, load lifting and transportation, logging operations, and similar industrial applications...wherever Diesel or gas engines or electric motors are used.

The torque converter transmits engine power to the job in a steady, smooth flow. All the shock of quick starting and fast acceleration of the load is absorbed hydraulically by the torque converter. This enables the engine to attain its optimum speed quickly . . . without lugging or stalling . . . and to deliver its full horsepower constantly.

The result: Your equipment will do more work or jobs per unit per operator per day, job cycles will be completed faster, engine life will be extended with less maintenance.

You have a choice of 6 basic hydraulic circuit sizes, each with a range of input ratings, to permit exact matching of torque converter to engines or motors of 100 to 1000 horsepower in practically every heavy-duty industrial application . . . on all power equipment—power shovels and drag lines, shovel loaders, cranes, drilling rigs, graders, logging equipment, and the like.

Our engineers will gladly discuss the application of National Torque Converters to your power equipment and make recommendations of exact size and torque capacity. Why not call on us?

THE NATIONAL SUPPLY COMPANY

Subsidiary of Armco Steel Corporation

TWO GATEWAY CENTER, PITTSBURGH 22, PENNSYLVANIA

tion on the transmission lube system and pressure lubricated bearings.

The rollers have been made larger and stronger and the pitch of the final drive gears has been coarsened to increase by as much as 49% the beam strength of the final drive gear. In-seat starting is an optional feature. CATERPILLAR TRACTOR CO., PEORIA, ILL.

Tractor-Drawn Scraper Is Increased in Size

The B. T. Fullpak—largest tractor-drawn scraper in the LeTourneau-Westinghouse line—has been modified so that its struck capacity is now 21 cu yd. It was formerly an 18.7-cu-yd machine designed for use with tractors of 150 hp or more. The changes, according to the maker, have no effect on loading characteristics. LETOURNEAU-WESTINGHOUSE CO., PEORIA, ILL.

Industrial Safety Hats Have Set Head Clearance

Industrial safety hats manufactured by Willson now feature a "Geodetic" strap suspension that maintains a constant clearance between head and hat.

The clearance, set at 1¼ in., is not changed by headsize adjustment of the main headband. The danger of that hat bottoming under impact is therefore reduced. Hats are available in several models. DEPARTMENT 284, WILLSON PRODUCTS DIVISION, 205 WASHINGTON ST., READING, PA.

Asphalt Batch Plant Line Increased by Two Units

Barber-Greene has added two new asphalt batch plants to its line. The Model 890 is rated at 1,000 lb capacity and the Model 891 is rated at 1,500 lb.

Both are basic four bin units, designed for production of all types of bituminous mixes. Both incorporate features of the company's larger "Batch-Omatic" plants. BARBER-GREENE CO., 400 N. HIGHLAND AVE., AURORA, ILL.

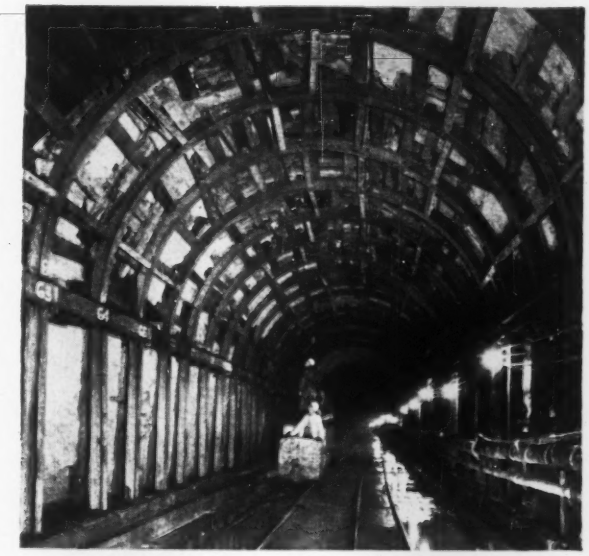
Dual Front Wheel Units Permit Greater Payloads

A dual front wheel truck assembly permits front axles to carry 18,000 lb or more and increase tire mileage by 50%, according to the manufacturer.

The unit's four front tires, mounted on standard wheel bearings, roll independent of each other. The dual front wheels are said to enable increased payload, additional "cube" capacity and a 30% greater turning angle for long vehicles. TRUCK EQUIPMENT CO., 3936 WALNUT ST., DENVER 5, COLO.

SCALING THE ROOF of Chicago's 79th Street water tunnel . . . prior to setting 6" H crown arch ribs. During the construction of the $7,852,000 tunnel, over 250,000 cubic yards of limestone are being burn cut, blasted and mucked from headings 164 feet below the surface. Over 4,700 feet of unstable ground requires reinforcement to prevent cave-ins . . . a situation further aggravated by the daily problem of pumping 1.3 million gallons of water. Despite these conditions, tunneling—including erection of support steel—progresses at a rate of 30 feet per 24 hours.

Perfect Safety Recorded for Over 25 Years with COMMERCIAL Tunnel Supports



NEARLY A MILE of the 15 ft. 1 in. x 16 ft. horseshoe tunnel roof and walls are supported by COMMERCIAL arch ribs carried on double 8" I continuous wall beams supported by 6" H posts. Channel lagging bolted to the outside flange of the arch ribs serves as intermediate support between ribs. Threaded rods tie the ribs and posts on 4 ft. centers. All members are custom formed to fit the job and assembly into a unit structure. This is the COMMERCIAL tunnel support system.

For more complete details on how COMMERCIAL steel liner plate can simplify and speed up your vertical shaft, surface or sub-surface tunnel project—help make it safer—send today for your copy of Catalog 300-C1. Address: Commercial Shearing & Stamping Company, Dept. E-17 Youngstown 1, Ohio.

OUR BEST BUY—"For over 25 years we have used COMMERCIAL tunnel supports. They have given us a perfect safety record," says W. A. LaVine, Assistant Project Engineer for S. A. Healy Company, the contractor. "We rely," he added, "on the broad experience offered by COMMERCIAL's engineers to aid us in the final choice of the proper weight and design of the members in tunnel support systems we erect—get a custom job on each project. On the basis of proven performance, experienced consultation service and just plain dollars-and-cents logic, our best source of supply for tunnel supports is COMMERCIAL SHEARING."

COMMERCIAL
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what makes the big new 71-B a great crane?

71-B

Performance makes it great!

This crane has more of the features you want to keep jobs *ahead* of schedule — more of the features that make erection jobs *really* profitable! Take a look — the 71-B, with its new tubular boom and jib, will reach a long 230 feet up! It combines this kind of reach with brute strength to give you an ideal lift combination.

NEW BOOM HOIST *SMOOTH AS SILK* . . . even with the biggest loads! It's fully independent of other operations, has power-controlled lowering and hoisting. The lowering disc-type clutch is a *new feature* — it's smoother when engaging and releasing.

FULL AIR CONTROLS OPERATE EASILY ON THE 71-B! The operator engages clutches, swingers, boom hoist — all with finger-tip ease. To keep the "feel" so necessary to good operation, graduated valves are used on main operating clutches.

THE 71-B's A GROUND HUGGER! Stability makes a key difference on BIG lifting jobs because a steady machine turns out measurably greater production. Weight of the 71-B is spread out over these long crawlers to make the rig rock solid!

THESE ARE JUST A FEW OF THE REASONS why the 71-B is an outstanding big crane. Get the facts from your Bucyrus-Erie salesman . . . have him demonstrate the 71-B and see the features that will make your lifting jobs more profitable.

For more information, write Dept. 11EE, Bucyrus-Erie Company, South Milwaukee, Wisconsin.

THIS NEW BOOM IS *LIGHTER — STRONGER*

The new tubular boom (available on 71-B) is lighter. You can use boom and jib combinations up to 230 feet. Bigger cross section makes the boom more stable.

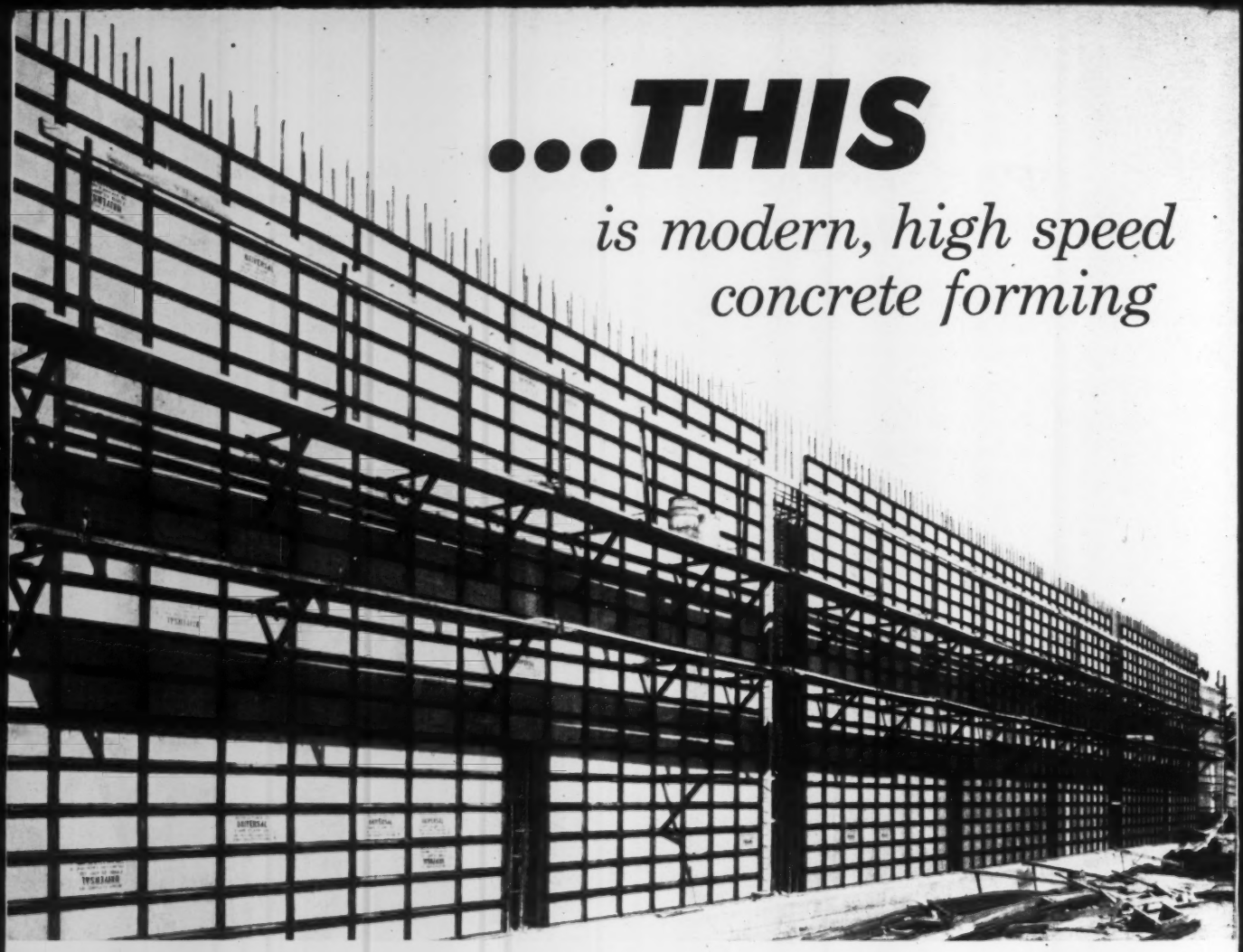
BUCYRUS ERIE®

Builds Better Equipment

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

...THIS

is modern, high speed concrete forming



THIS IS UNI-FORMING... THE FASTEST GROUND-TO-GROUND SYSTEM

of concrete forming capable of handling virtually any type of poured concrete structure. UNI-FORMING is faster because assembly of UNI-FORM Panels with UNI-FORM Ties and Tie Keys is a simple mechanical (and automatically accurate) process . . . faster because minimum alignment and bracing is required on 1 side only . . . faster because every forming requirement is engineered into the system. In addition to its speed you'll find that the UNI-FORM System of concrete forming has many other advantages you can use to save time, money and labor.

UNI-FORMING HAS 3 BASIC ELEMENTS

1.

The UNI-FORM Panel is plywood faced, steel framed to provide strength and rigidity plus all the advantages of a nailing surface. Made in standard heights from 1 ft. to 8 ft.; widths 2 ft., 18".

2.

UNI-FORM Ties lock and spread UNI-FORM Panels. Made for all wall sizes. Special ties available.

3.

UNI-FORM Tie Keys securely lock Panels and Ties together.

Want more information on the UNI-FORM System? Write for new full line catalog today.

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Universal Form Clamp Co. of Canada, Ltd., 226 Norseman St., Toronto, Ontario

Boston Civil Engineers Elect Keane President

Edward C. Keane, vice president of Fay, Spofford & Thorndike, Inc., Boston consulting engineers, has been elected president of the Boston Society of Civil Engineers.

The organization is the oldest engineering society in the United States. The election was held at its 111th annual meeting.

Mr. Keane is a member of Boston's planning board and he is a past president of the Massachusetts Section of the American Society of Civil Engineers.

Arthur T. Ippen, professor at Massachusetts Institute of Technology, and James F. Brittain, of Stone & Webster Engineering Corp., Boston, were elected vice presidents of the society.

Boss and Chief Engineer Join in New Partnership

Charles H. Lee, consulting engineer of San Francisco, Calif., has formed a partnership with Michael Praszker, his former chief engineer, under the firm name Lee & Praszker, consulting civil engineers, for the practice of soil mechanics, foundation engineering and applied hydrology.

The firm's offices and soil testing laboratory will remain at 58 Sutter St., San Francisco, where Mr. Lee has maintained his headquarters since 1921.

Mr. Praszker is a graduate of the University of London in applied mathematics and the University of California in civil engineering. His previous engagements have included the University of California, Field Research Station, Richmond, Calif.; the Engineering Department, Pacific Gas and Electric Co.; and various field assignments in construction and research.

Careers

Business

Stanley A. Kroll, formerly a vice president of Taller & Cooper, Inc., Brooklyn, N. Y., has opened a consulting office in Brooklyn.

J. J. Pigott has been appointed vice president in charge of operations in Toronto by the Pigott Construction Co., Hamilton, Ontario. **J. M. Pigott, Jr.,** has been named manager of the company's Hamilton division. **A. C. Schwenger** will assume managership of the Toronto office and **M. V. Aykroyd** will manage the Quebec division.

O. W. Kayser and **Peter H. Smith** have been appointed assistant vice presidents of Gibbs & Hill, Inc., New York City.

Eric J. Eachus, formerly a member of the Tennessee Department of Highways, has joined the staff of the Oak Ridge, Tenn., Y-12 Plant, an atomic energy installation operated by Union Carbide Nuclear Co., a division of Union Carbide Corp.

Gerald McKee, Jr., Seymour Berger and **Anthony E. Mansueto** have joined to form McKee-Berger-Mansueto, Inc., New York City, a company specializing in construction costs work.

Engineering executive promotions of John F. Meissner Engineers, Inc., Chicago, include: **Eugene A. Bartkus,** with the company since 1951, to chief engineer; **Nolan H. Williams,** chief engineer since 1952, now vice president of engineering; **Donald T. Grange,** formerly in charge of the construction department, to vice president and manager of construction.

Public Works

Edward F. Dayton, since 1956 assistant district engineer in the Albany District of the New York State Public Works Department, has been named acting deputy chief engineer. He replaces **Henry TenHagen,** recently promoted to chief engineer.

John J. Senesy, president of the Construction Service Co. and director of the Bound Brook, New Jersey Water Co. for the past eight years, has been elected president of the water company. He succeeds **Frederick C. Brush,** president of the utility for the past nine years. Mr. Brush will continue as a water company director and technical consultant.

William B. Henry has been named by the Ohio Department of Highways to be engineer of District 12, in Cleveland. He replaces **Arthur R. Endres,** who will work as a location and design engineer.

4-D

WROUGHT IRON CONDUIT delivers low-cost uninterrupted service

WHERE TO USE IT:

- direct burial in earth
- burial in concrete
- submarine cables
- offshore platforms
- bridge structures
- industrial plants

HERE'S WHY:

- optimum corrosion resistance
- no internal flaking or clogging
- impact resistance
- easy fabrication
- UL approved
- sherardized, MVC-1 coating
- black or hot dip galvanized finish
- all pipe sizes available
- long random lengths available
- fewer joints necessary
- black or galvanized threads

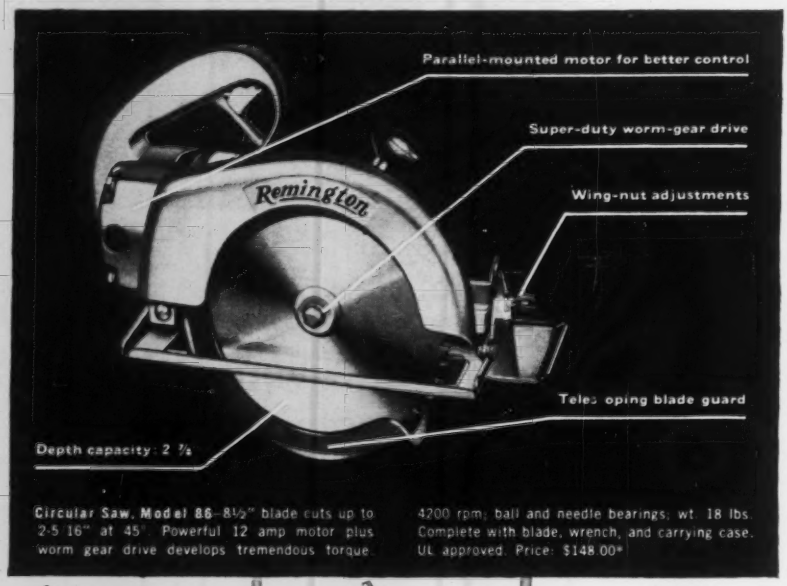
Write for technical data on specific applications

BYERS 4-D WROUGHT IRON

Tubular and Flat Rolled Products

A. M. Byers Co., Pittsburgh 22, Pa.

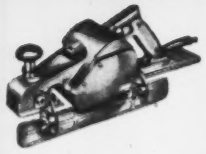
POWER to boost job efficiency with REMINGTON tools



Circular Saw, Model 86—8½" blade cuts up to 2-5/16" at 45°. Powerful 12 amp motor plus worm gear drive develops tremendous torque. 4200 rpm; ball and needle bearings; wt. 18 lbs. Complete with blade, wrench, and carrying case. UL approved. Price: $148.00*

Power Trowel, Model TG4-26—2½-hp, 4-cycle, gasoline-powered engine; 26" ring size; automatic recoil starter; centrifugal clutch disengages at idle. Price $340.00.

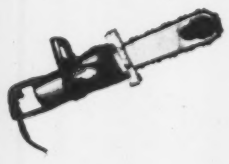
Electric Drill, Model 125—½" capacity; 7-amp motor, most powerful in its class; 500 rpm; rugged construction yet light weight; 8½ lbs. Price $73.00*



Plane, Model 3P—Extra-heavy-duty, 3" combination door and surface plane—converts by removing fence; superb balance; 8.4-amp motor. Price: $170.00*

Remington delivers power, mobility and easy handling to help you cut costly man-hours on the tough jobs. Remington Power Tools are designed and built for extra-long service with minimum maintenance. Your Remington distributor stocks and services the industry's widest selection of power tools and parts.

Concrete Vibrator 10GVR has 5-hp, air-cooled, variable-speed gas engine—up to 3,200 rpm. Economical. Up to 10,000 v.p.m. Price from $414.00.



Electric Chain Saw, Model 11E12D—12-amp universal motor; hardened steel bevel gears; 12" bar with Roller Bearing nose; Wt.: 18 lbs. Price $120.00*

CHOOSE THE POWER MOST EFFICIENT FOR YOU. REMINGTON POWER TOOLS ARE AVAILABLE IN **AIR · ELECTRIC · GASOLINE AND CARTRIDGE-POWERED MODELS**

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Obituaries

Edwin G. Adams, 88, former director of the civil engineering department at Tientsin Imperial University in China. Mr. Adams was at one time associated with former President Herbert Hoover on engineering projects in China. He also directed mapping projects in China for the Russo-Chinese Bank and the Belgian Government. In the early 1900's he was a partner in the firm of Adams & Knowles, active in construction in northern China. Mr. Adams graduated from Rensselaer Polytechnic Institute in 1891 as a civil engineer.

Victor M. Ehlers, 75, state sanitary engineer of Texas and a pioneer in public health and sanitary engineering in the Southwest. Active at national as well as state level, Mr. Ehlers was one-time president of the Federation of Sewage and Industrial Wastes Associations and vice president of the American Public Health Association. A graduate of Texas A & M College in 1905 and Cornell University (C.E. degree) in 1910, he launched his career in Texas as a consulting engineer, designing a number of municipal sewer systems. He was influential in 1915 in getting the Texas State Health Department to establish the Office of Sanitary Inspector. He agreed to serve in the position temporarily and decided to remain. He eventually became director of the Division of Sanitary Engineering.

Charles R. Vanneman, 78, a consulting engineer in the public utility field since 1931. He was a graduate of Cornell University and formerly served as chief engineer of the New York State Public Service Commission.

John B. Saxe, 56, since 1957 vice president and chief consulting engineer of Gibbs & Hill, Inc., New York City consulting engineers. Mr. Saxe began his career on construction of the Holland Tunnel after graduating from Harvard Engineering School with a civil engineering degree in 1923. He joined Gibbs & Hill in 1924, became the firm's chief mechanical engineer in 1945, chief engineer in 1953 and a vice president in 1954. As chief engineer he directed engineering work in the firm's offices in New York, Los Angeles and Tampa. He also was in charge of power plant projects in Belgium, Spain, Italy, Formosa, Venezuela and Colombia.

George G. Honness, 87, retired civil engineer. An 1893 graduate of Lafayette College, Mr. Honness spent most of his professional life on the construction of New York City's water supply system.

U.S. AIR FORCE ACADEMY

concrete floors hardened with

LAPIDOLITH

(patented concrete hardener)

The tramp of thousands of feet a day will cause little wear on the floors of the 7 Air Force Academy Buildings at Colorado Springs. They have been treated with Sonneborn LAPIDOLITH, which makes concrete floor surfaces harder and denser—prevents crumbling and dusting. This ruggedness is due to LAPIDOLITH not being a coating or film. No other hardener made reacts on concrete so that it becomes an integral part of the concrete to case-harden in depth.

When applied according to specifications LAPIDOLITH has a bonded guarantee. Its lasting hardness and heavy service reduces maintenance, protects against oil and chemicals, and it is easy to apply.

Send today for LAPIDOLITH literature.

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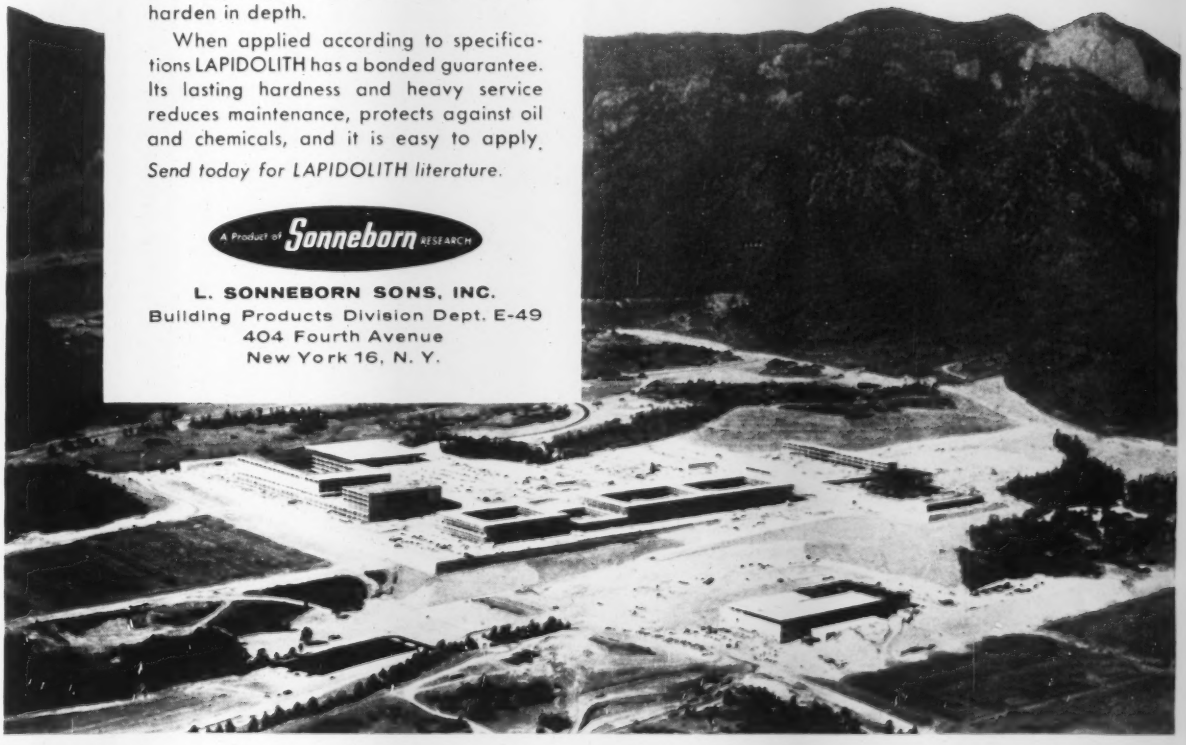

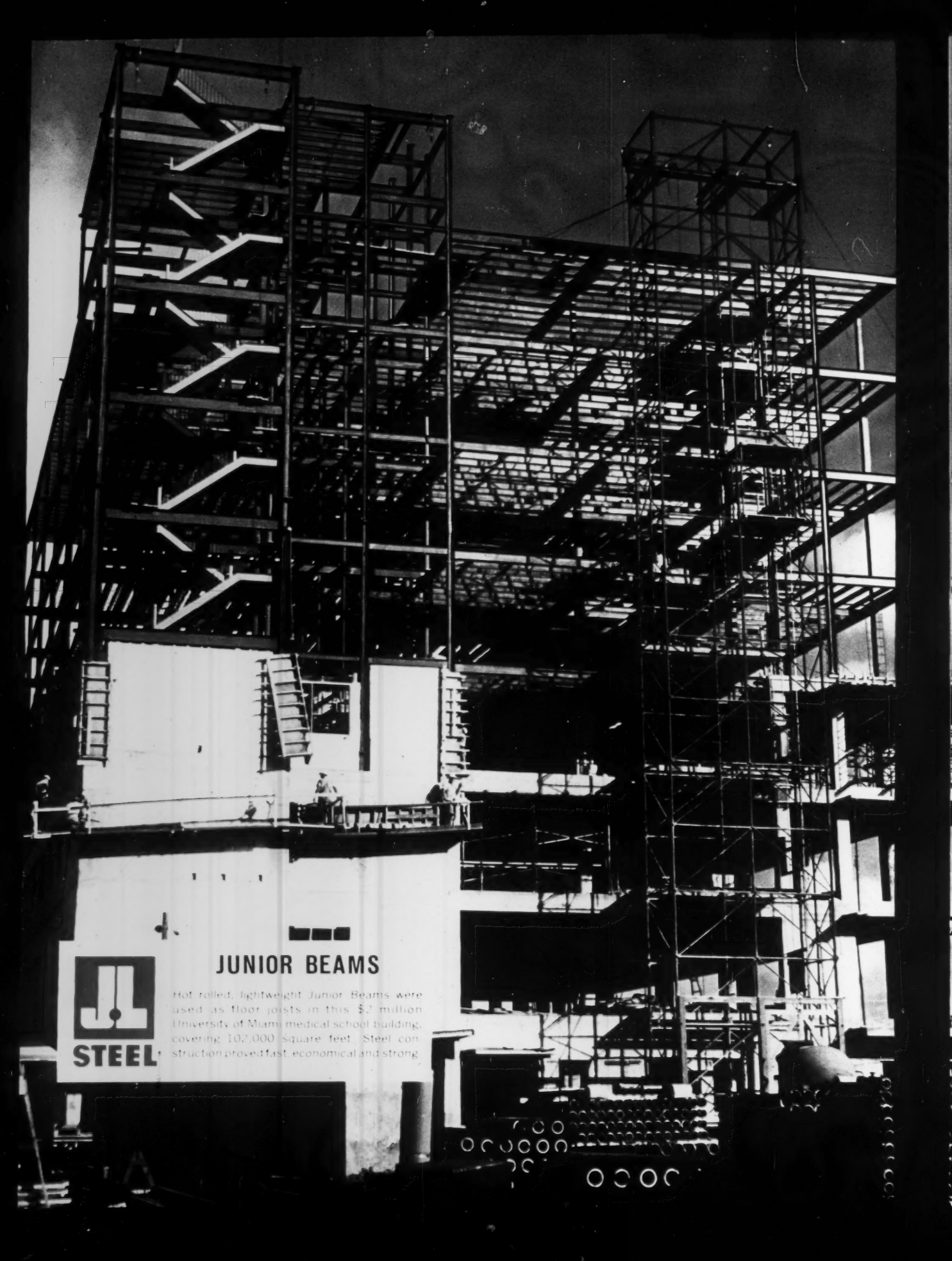
JUNIOR BEAMS
Hot rolled, lightweight Junior Beams were used as floor joists in this $2 million University of Miami medical school building, covering 102,000 square feet. Steel construction proved fast, economical and strong.
STEEL

"We specified Junior Beams for strength in a hurricane area, plus economy and speed in construction"

. . . reports Miami structural engineer

"We saved considerable time and money by using 12-inch Junior Beams as floor joists in this University of Miami medical school building," states Mr. Winston C. Gardner, structural engineer with Steward-Skinner Associates, designers of the structure.

"Concern for costs, speed of construction and hurricanes dictated the use of steel frames and floor joists. Junior Beams were framed into the main structural members on two-foot centers in spans of 22 feet in each of 25 bays, 18 feet wide."

The Junior Beams also serve as a base for attaching a vermiculite ceiling. Unistrut hangers for plumbing and electrical lines are welded to the bottom flange of the Junior Beam floor joists. Eight tons of J&L Junior Channels were used as stair stringers in two stair wells.

Lightweight Junior Beams, with uniform physical properties and specific dimensions, are easily adaptable to a wide range of architectural design. Economies realized during fabrication and erection reduce your total cost per square foot.

Junior Beams and other J&L lightweight structurals are readily available. Call your local steel service center, or write Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

Junior Beam floor joists, framed below the flange of the main structural members, give greater strength to this nine-story university building.

Design: Steward Skinner Associates, Miami
General contractor: Edward M. Fleming Construction Co., Miami
Structural steel fabricator and erector: Sheffield Steel Products, Inc., Miami

J&L STEEL

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

New kind of fire-resistant ductwork

for people who don't like big maintenance bills

Plastic ductwork like this can keep corrosive fumes and smoke from chewing a big hole in your plant budget.

It's strong, light in weight, simple to install—and is outlasting other materials by sensational margins in the most corrosive kinds of service.

In a textile dye plant, for example, other duct systems—even with special lining—failed in 14 months or less under the combined assault of wet chlorine, hydrogen bromide, hydrochloric acid, and organic solvents. Plastic ducts like this were installed—and have lasted more than four years without repairs and without a sign of deterioration!

There's no fire hazard with these ducts, either. They're made of Hetron® flame-resistant polyester, reinforced with fibrous glass. Subjected to severe flame-spread tests, this plastic proves far safer than many common building materials. It's designed to meet stiffest code requirements. It can't ever contribute to a blaze or cause one to spread.

To really whip corrosion, you can get hoods, tanks, stacks, trays, scrubbers, and fans in sizes to 36,000 cfm—as well as ducts—all made of tough, fire-safe Hetron. We make the Hetron resin only. For names of fabricators who supply the ducts and other equipment, write us.

DUREZ PLASTICS DIVISION
HOOKER CHEMICAL CORPORATION

3903 Walck Road
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Bidding is keen for improvements at . . .

Minot, N. D. Air Force Base

Though the $392,494 award to Fred R. Comb Co., Minneapolis, by the Corps of Engineers, Omaha, Neb., was 6% above the engineer's estimate, it was only a fraction of a percent below the second and third bids for this Minot, N. D., Air Force Base contract.

Work includes a shop building, a 20,000-bbl. above-ground jet fuel storage tank, earth dike, piping, fencing and lighting, 6,420 lin ft of water line, 12,600 sq yd of bituminous paving and 6,170 lin ft of security fence.

The $89,000 lump sum bid for the 4,290 sq ft shop building averages $20.75 a sq ft, including structural excavation and backfill, utilities stubbed out, concrete stoops, apron, and washrack with granular base but exclusive of washrack inlet.

The $20,000-bbl. above-ground jet fuel storage tank is included in a lump sum bid of $91,000, which averages a capacity cost of $4.55 a bbl. inclusive of piping and switch manifold installation, dike, grading, fencing, flood lighting, fire protection system, and appurtenances.

Minimum wages include: carpenter, $2.70; concrete finisher, $2.80; tractor operators, $2.22-$2.65; crane and shovel operators, $2.90-$3.00; common laborer, $1.76.

1C Fred R. Comb Co., Minneapolis	$392,494
2 Otto J. Eickhof & Son, Inc., Crookston, Minn	393,480
6 Korshoj Constr. Co., Inc., Blair, Neb.	414,178
EE Corps of Engineers, Omaha, Neb.	369,684

Bids: 1-13-59 Items	Un	Quantity	Unit Prices 1C	2
Storage Base Jet Fuel				
Jet fuel storage facilities*	ls	job	$91,000	$80,067
Seeding	ls	job	500 00	525 00
Shop, Ground Powered Equipment				
Shop building **	ls	job	89,000	99,404
Excavation	cy	600	1 65	1 72
Conc curb & gutter remov	lf	175	2 00	2 08
Subbase course	sy	800	1 45	1 51
Granular filter course	sy	850	0 88	0 91
Base course	sy	655	1 95	2 03
Bituminous prime coat	gal	325	0 38	0 40
material	gal	1,025	0 32	0 33
Surface course	sy	655	3 25	3 38
Concrete curb & gutter	lf	650	4 05	4 21
walk	sf	430	0 85	0 88
Subdrain	lf	280	4 25	4 42
flush & observn risers	ea	1	150 00	156 00
Manholes	ea	1	525 00	546 00
Storm drains	lf	25	13 00	13 52
tap to existing	ea	1	60 00	62 40
Washrack inlet	ea	1	650 00	676 00
Water pipe line, 1½"	lf	155	7 00	7 28
6"	lf	30	10 00	10 40
Fire hydrant	ea	1	500 00	520 00
Service stops & boxes	ea	1	150 00	156 00
Sanitary Sewer pipe	lf	95	7 50	7 80
Pavement remov & repl	sy	10	25 00	26 00
HTHW distribution system	ls	job	1,500	1,630
Electric distribution system	ls	job	3,500	3,500
Seeding	ls	job	500 00	520 00
Alert Apron Perimeter Utilities				
Gate house, complete	ls	job	1,700	1,392
Excavation & borrow	ls	job	6,500	6,760

Bids: 1-13-59 Items	Unit	Quantity	Unit Prices 1C	2
Granular filter course	sy	17,350	$0 75	$0 78
Subbase course	sy	13,075	0 95	0 99
Base course	sy	13,075	1 80	1 87
Bituminous prime coat	gal	5,170	0 38	0 40
material	gal	13,410	0 32	0 33
Surface course	sy	11,420	2 15	2 24
Water pipe line, 8"	lf	5,070	8 25	7 58
6"	lf	1,350	12 90	12 42
Fire Hydrants	ea	9	475 00	494 00
Gate valves & boxes	ea	2	275 00	286 00
Chain link security fence	lf	6,170	2 90	3 20
gate	ea	1	350 00	364 00
Elec distr & secur ltg sys	ls	job	14,000	14,373
Topsoil	ls	job	3,500	3,640
Seeding	ls	job	2,500	2,600

Completion schedule: 240 cal days

*Complete, incl above-ground tank, fuel pipe & switch manifold instals, dikes, grading, fencing, flood ltg, grdg, fire prot sys, and all appurtenances

**Complete, incl struct exc & bkfl, utilities stubbed out, conc stoops, apron & washrack, incl gran base but excl washrack inlet

Grading Iowa Road Averages $152,250 a Mile

On a low bid of 25 cents a cu yd for 1,388,817 yd of excavation and borrow, 26% below the second bid for this item, R. B. Burch, Inc., Cedar Rapids, Ia., won this $603,205 Iowa State Highway Commission award for grading 3.962 of Interstate Route 80 in Polk County, an average of $152,247.60 a mile. John G. Butter is chief highway engineer at Ames, Ia.

The job includes culverts, removal of old structures, surfacing a detour and related work.

Prevailing wages include: tractor operator $2.25; crane & shovel operator $2.725; common laborer $1.50.

The bidding included:

1C R. B. Burch, Inc., Cedar Rapids, Ia.	$603,205
2 J. D. Armstrong, Inc., Ames, Ia	626,967
3 Lowe Constr. Co., Marion, Ia	823,161

Bids: 1-13-59 Items	Unit	Quantity	Unit Prices 1C	2
Exc & borrow, cl 10, rdwy	cy	1,388,817	$0 25	$0 337
chan, cl 10	cy	39,920	0 30	0 40
Overhaul	sta-yd	22,181,045	0 005	00
Bkfl, sel, glacial clay	cy	104,206	0 30	0 35
reclaimed surf	cy	423	0 75	1 00
special	t	15,210	2 00	2 10
Exc, cl 20, rdwy pipe culv	cy	2,739	1 00	0 50
Reinf conc rdwy culv, 18"	lf	2,530	4 00	3 50
24"	lf	1,898	5 50	5 50
30"	lf	882	7 50	7 75
36"	lf	504	10 00	10 50
42"	lf	332	13 00	13 00
48"	lf	633	17 00	17 00
54"	lf	172	20 00	21 00
Conc special apron, 18"	ea	31	50 00	35 00
Cor met rdwy culv, 18"	lf	290	4 00	3 85
entr culv, 18"	lf	120	4 00	3 50
elbows	ls	job	350 00	330 00
Cr stn, cl A, on road	t	2,068	2 00	nb
Gravel on road, cl C	cy	2,068	nb	3 00
Compaction of bkfl	cy	70	2 00	4 00
Cor met arch rdwy culv, 58"x36"	lf	76	18 00	18 00
Formed stl beam rail	lf	25	5 00	5 00
Posts	ea	5	10 00	12 00
Intake, type N	ea	2	125 00	175 00
Tile drain, ext qual, 8"	lf	300	1 00	2 00
Detour surfacing	t	1,142	2 00	2 10
recl, stkpl & sprd matl	cy	457	0 75	1 00
Structs, remov old	ls	job	1,400	2,600
Clear & grub (engr's est)	ls	job	3,174	3,174
Water on road	Mgal	20,833	0 25	0 10

Commence: 4-1-59 Complete: 8-15-59

4-D

WROUGHT IRON SNOW MELTING SYSTEMS assure permanent winter traffic safety

WHERE TO USE IT:

- hazardous highway areas
- highway approaches
- toll booth areas
- airport runways
- hangar door aprons
- airport taxi strips
- passenger loading areas
- ramps
- "drive-in" banks
- driveways
- marquees, balconies
- loading docks
- sidewalks

WHY 4-D WROUGHT IRON?

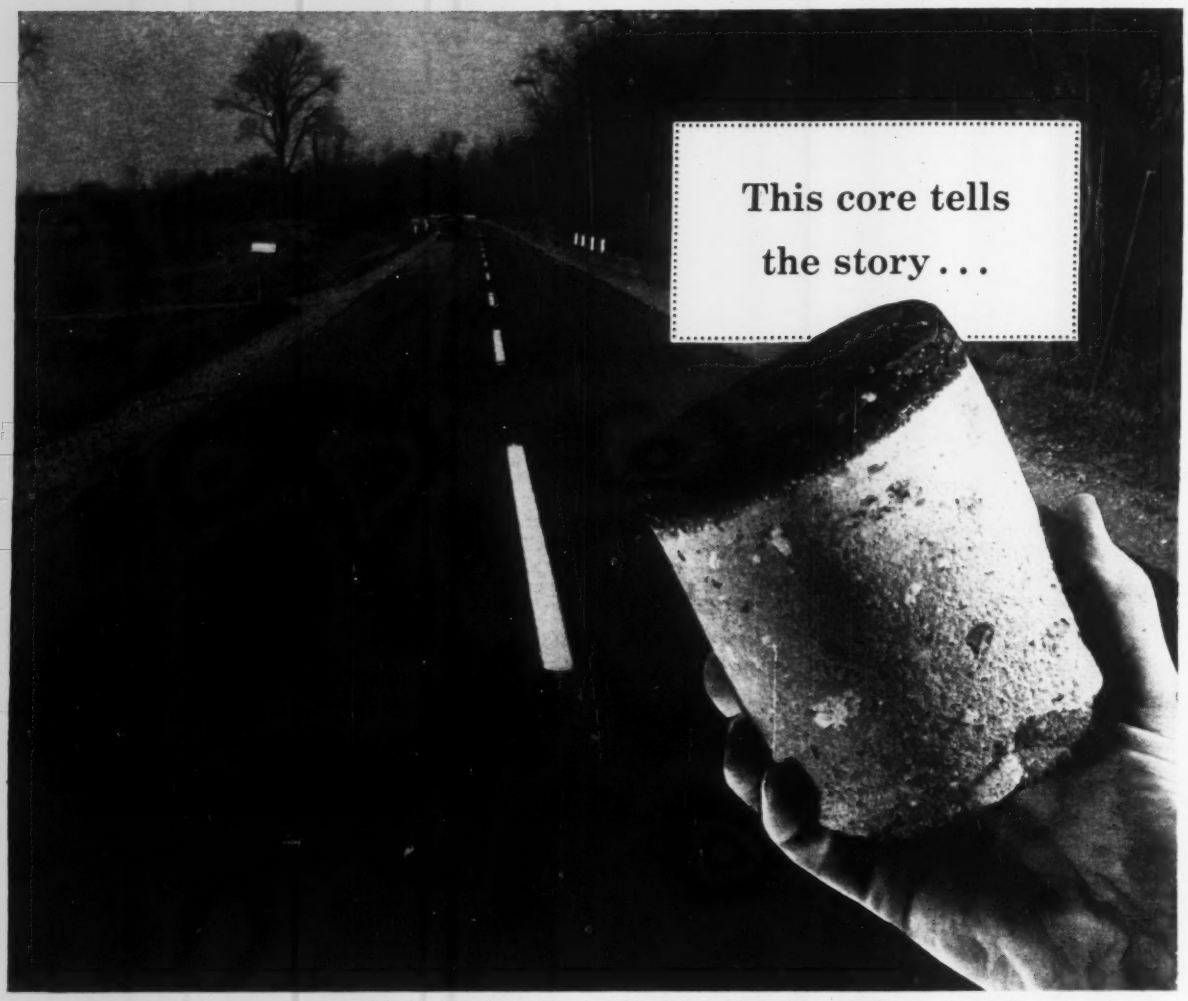
- built-in corrosion resistance
- good heat transfer properties
- rugged strength
- crushproof
- no thermal stresses with concrete
- good bending properties
- welds soundly, easily
- leakproof
- lowest cost per year of service

Write for technical data on specific applications

BYERS 4-D WROUGHT IRON

Tubular and Flat Rolled Products

A. M. Byers Co., Pittsburgh 22, Pa.



By 1958, compressive strength had increased to 2,150 psi on this 1940 road in Androscoggin County, Maine. This soil-cement pavement has successfully withstood temperatures from –28°F. to 102°F. Approximate average precipitation for this area is 40 inches.

18 years on Maine's Route 136

. . . soil-cement pavement grows stronger year by year!

Proved again – soil-cement holds up like no other low-cost pavement, delivers long years of service as shown on Maine's Route 136.

You start saving right away with soil-cement . . . in most cases 75% of the materials are free. Mix almost any soil, even old gravel bases and blacktop surfacing, with portland cement and water. Then place a thin bituminous surface after the mixture hardens. That's it. More than a mile a day can be built by well-organized crews using modern equipment. Genesee County, Michigan, recently set a 3.5-mile-a-day record.

And soil-cement is stronger inch for inch than any other paving material short of concrete. No potholes or soft spots. Upkeep is low.

Low first cost, low maintenance and long life stretch road budgets, permit long range programming by highway engineers.

It's America's fastest-growing, low-cost pavement. In 1958, contracts for soil-cement on roads, streets, shoulders, subbase, airports and parking lots were almost double the previous year. Free, illustrated literature, distributed only in the U.S. and Canada, on request.

MODERN
soil-cement

PORTLAND CEMENT ASSOCIATION
Dept. A1-35, 33 W. Grand Ave., Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete

Materials Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint, Roofing: Last, Feb. 26: Next, Mar. 26.
- Wage Rates, Building Board, Lath, Insulation: Last, Feb. 26: Next, Mar. 26.
- Cement Aggregates, Ready-mixed Concrete, Asphalt: Last, Mar. 5: Next, Apr. 9.
- Iron & Steel Products, Pipe: Last, Mar. 12: Next, Apr. 16.

LUMBER, TIMBER, PLYWOOD—PER M FT., B. M., CARLOAD LOTS F.O.B.

SOUTHERN PINE AND DOUGLAS FIR

All Southern Pine is No. 2 common or better and for No. 1 N. C. Bev. (Prices in Bold Face)

All Fir boards, dimensions, planks No. 2; Fir small timbers and timbers are No. 1. Lengths up to 20 ft. (Prices in italics)

		1x6 std	1x8 std	2x4 std	2x6 std	2x8 std	2x10 std	3x12 Rgh	6x12 Rgh	12x12 Rgh
Atlanta	n†	$73 00	$76 00	$76 00	$79 00	$81 00	$86 00	$136 00	.....	.....
Baltimore	o	95 00	100 00	102 00	102 00	102 00	107 00	119 00		
		115 00g	*118 00g*	*128 00g*	*128 00g*	*128 00g*	*128 00g*	*148 00g*	*$165.00*	*$155.00*
Birmingham	n†r	83 00	85 00	84 00	84 00	89 00	95 00	111 00	.....	.....
		80 00	*80 00*	*79 00*	*81 00*	*81 00*	*88 00*	*85 00*	*80.00*	*80.00*
Boston	n‡	98 00f	99 00f	107 00f	107 00f	107 00f	107 00a	.....	.....	.....
		105 00	*105 00*	*117 00*	*117 00*	*117 00*	*117 00*	*156 00*	*158.00*	*158 00*
Chicago	**	118 00	121 00	115 00	129 00	137 00	138 00	133 00	144 00	161 00
		121 00	*121 00*	*127 00*	*135 00*	*135 00*	*136 00*	*144 00*	*144.00*	*144.00*
Cincinnati	n*	99 50	100 75	93 50	95 00	101 75	109 75	121 00	.....	.....
		100 50	*102 75*	*105 75*	*106 50*	*105 50*	*122 50*	*136 75*	*136.75*	*136.75*
Cleveland	o**	92 00	94 00	97 00	98 00	100 00	104 00	.....	.....	.....
				108 00	*107 00*	*110 00*	*107 00*	*129 00*	*129.00*	*129.00*
Dallas	‡R	76 00k	85 00k	80 00k	80 00k	78 00k	78 00k	125 00	.....	.....
Denver	n*	*Not in stock*		*118 50*	*118 50*	*118 50*	*130 50*	*156 00*	*148.50*	*158.50*
Detroit	‡	130 00	132 50	130 00	128 00	135 50	135 50	.....	.....	.....
		136 00	*136 00*	*137 00*	*151 50*	*139 00*	*144 00*	*204 00*	*221.00*	*221.00*
Kansas City	tn	125 00	125 00	125 00	130 00	135 00	145 00	.....	.....	.....
		185 00	*185 00*	*185 00*	*180 00*	*185 00*	*155 00*	*165 00*	*235.00*	*235.00*
Los Angeles	nu	*108 00*	*108 00*	*108 00*	*108 00*	*108 00*	*108 00*	*180 00*	*185.00*	*185.00*
Minneapolis	os	*150 00m*	*150 00m*	*150 00*	*150 00*	*150 00*	*150 00*	*185 00*	*185.00*	*185.00*
Montreal	*bpu	87 00a	94 00a	87 00a	88 00a	104 00a	128 00a	.....	.....	.....
		165 00	*165 00*	*165 00*	*165 00*	*165 00*	*165 00*	*170 00*	*170.00*	*170.00*
New Orleans	tn	89 00	89 00	95 00	92 00	92 00	97 00	126 00	.....	.....
		118 00	*118 00*	*107 50*	*118 00*	*118 00*	*118 00*	*140 50*	*140.50*	*160.50*
New York	t	115 00	117 00	125 00	125 00	125 00	130 00	245 00	.....	.....
		.....	.....	*126 00*	*126 00*	*126 00*	*135 00*	*169 00*	*169.00*	*169.00*
Philadelphia	‡n	.....	Range from 112 132				117 137	117 137	.....	.....
			Range from 128/158				*127/157*	*157 /158*	*158.00*	*158.00*
Pittsburgh	n†	115 00	120 00	130 00	120 00	125 00	130 00	150 00	.....	.....
		120 00	*120 00*	*110 00m*	*150 00*	*150 00*	*150 00*	*220 00*	*185.00*	*185.00*
St. Louis	lnr	125 00	127 00	135 00d	135 00d	135 00e	140 00e	.....	.....	.....
				145 00e	*145 00e*	*145 00e*	*145 00e*	*197 00e*	*197.00e*	*197.00*
San Francisco	n	*98 00*	*98 00*	*97 00*	*97 00*	*97 00*	*97 00*	*109 00*	*150.00*	*150.00*
Seattle	n†	*68 00*	*75 00*	*78 00*	*78 00*	*78 00*	*78 00*	*90 00*	*95.00*	*95.00*
Toronto	*	100 00a	105 00a	98 00a	92 00a	97 00	97 00a	110 00a	.....	.....
		115 00	*118 00*	*180 00*	*194 00*	*128 00*	*128 00*	*138 00*	*135.00*	*141.00*

	LONG LEAF Y. P. Merchantable grade up to 20 ft.		FIR PLYWOOD	
	2x12 Rgh	12x12 Rgh	3/8" Interior plyscored, C-D gr.	3/4" Plyform grade*
Atlanta	$121 00	$156 00	$135.00	$216.00
Baltimore	175 00	190 00	175.00	260.00
Birmingham	120 00	168 00	145.20	256.94
Boston	.....	.....	180.00	250 00
Chicago	161 00	161 00	173.00	283 00
Cincinnati	138 00	135 00	115.00f	220.00f
Cleveland	.....	.....	139 00a	256 00a
Dallas	133 00	160 00	112.50ac	196.00ac
Denver	.....	.....	.....	.....
Detroit	143 50	.....	180.00g	285.00g
Kansas City	.....	.....	162.75	246.75
Los Angeles	.....	.....	140.00	260.00
Minneapolis	.....	.....	190.00	310.00
Montreal	122 00	122 00	119.25	225.95
New Orleans	160 00	153 00	122.41	201 00
New York	245 00	255 00	141.20a	255.60a
Philadelphia	226 236	226 236	145.00h	260.00h
Pittsburgh	150 00	185 00	190.00	295.00
St. Louis	.....	.....	185.02achj	290.02achj
San Francisco	.....	.....	112.00h	220.00h
Seattle	.....	.....	125.00acg	236.00acg
Toronto	98 00a	.....	245.00	319.00
	.....	.....	.....	.....

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL.

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. •a Spruce. •b Federal tax exempt, add 6% mun. & prov. tax. •c 5M lots. •d 8, 10, & 12 ft. lengths. •e 8 to 16 ft. lengths. •f Hemlock •g No. 1 common. •j 8 ft. lengths. •k No. 3 common. •l Add 2% sales tax. •m Up to 16 ; No. 3 western pine, $125. •n Less 2% disc. 10 days •o Less 2% disc. 10th. •p Less 1% disc. 10 days. • q fir: $80.25 in truck lots, fob job or CL, f.o.b. city. •r for f.o.b. city price add $8 for pine, $35 for fir. •s asd truck lots 5 6 Mfbm. •t trucklots del. •u Retail LCL yard. •v Retail LCL, del. •w add 6% Mun. & Prov. tax.

• PLYWOOD (Plyform, oiled and edge sealed : Douglas fir, 4' x 8' panels, 5-ply sanded 2 sides, carload lots, delivered per 1000 sq. ft. surface. Seattle base price, Interior, moisture resistance, 3/8", $196.00; 1/2", $216.00 Exterior, waterproof, 1/2", $200.00; 3/4", $220.00. •a Dellvered. •b Price may increase this month. •c Truck lots. •d A-C exterior. •e LCL. •f less 1%, 5 days. •g less 2% for cash. •h less 2% disc, 10 days. •j add 2% sales tax.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS: Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	WINDOW GLASS: Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength B quality	EXPLOSIVES: Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 500 lb. lots*
Atlanta	78%eR	79%g	$0.2615
Baltimore	74%d	76%d	.2615
Birmingham	82%f	82%f	.2265
Boston	72–10%p	72–10%p	.2615
Chicago	72%	72%	.2265
Cincinnati	74%	74%	.2615
Cleveland	74–2–10%	74–2–10%	.2615
Dallas	76%	76%	.2690
Denver	73.5%	73.5%	.2615
Detroit	74–10–10%	74–10–10%	.2615
Kansas City	76–10–10%	76–10–10%	.2615
Los Angeles	70%	76%e	.2610
Minneapolis	71–10%	71–10%	.2615
Montreal	40–10–5%bc	40–10–5%	23.20A
New Orleans	76%q	76%q	.2615
New York	79%l	79%l	.49q
Philadelphia	76–10%n	76–10%n	.2615
Pittsburgh	72%	72%	.2615
St. Louis	72–10–10%mo	72–10–10%mo	.2615
San Francisco	60%	73%	.2615
Seattle	$8.85/11.55hi	$6.41/8.67hj	.2615
Toronto	7.10/10.65n	6.45/9.20n	

Price of 60% Ammonia Gelatin is $0.16 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: •a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. •b sales tax extra. •c 77% for single strength. •d From 6/15/52 list. •e 77% for double strength. •f Single strength; double strength, 83%. •g From 8/1/58 list. •h Ss ds, 40-in. •i 20 boxes min. •j CL quantity. •k eff. 12/58. •l eff. 10/15/58. •m less 2% disc, 10 days. •n less 1% disc, 10 days. •o add 2% sales tax. •p less 1% for cash.

Explosives: * Cartridges of 1 1/4" diameter or over, in standard lengths. •g deliveries in certain areas must be by truck or by truck and boat, requiring extra charge. •h F.o.b. Beloeil (near Montreal), per 100 lb., lots under 2000e, wood cases, forcite, 40%. Forcite 60%, $23.80 In fiber cases: forcite 40%, $23.20; forcite 60%, $24.95.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades):

	C L 30,000 lb. lots	10,000 lb. lots	2,000 lb. lots	200 lb. lots
Group 1*	$0.2015	$0.2065	$0.2465	$0.2615
Group 2†	.2090	.2140	.2540	.2690

* All areas except those in Group 2 and N. J. cities of Bayone, Hoboken, Jersey City, No. Bergen, Union City and Weehawken. † Florida counties of Manatee, Hardee, Highlands, Okeechobee, St. Lucieand south thereof; Idaho; Maine; Montana; New Mexico counties of Catron, Socorro, Lincoln, De Baca, Roosevelt and south thereof; Texas counties of Bailey, Lamb, Hale, Floyd, Motley, Cottle, Hardeman, Foard, Knox, Haskell, Jones, Taylor, Coleman, McCulloch, San Saba, Burnet, Williamson, Milan, Robertson, Leon, Houston, Angelina, Nacogdoches, Shelby and south thereof.

PILES, TIES

PILES

Prices per linear foot, fir and pine, rough peeled, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area: pine under fifty feet based on freight from mid-South, over fifty feet, on freight from deep South.

Dimensions	Points	Length	By Rail Pine*§ R	By Rail Fir R
12" at butt	6-in.	30 to 39-ft.	$0.32a	.....
12"—2-ft. from butt	6-in.	40 to 44-ft.	.69	.....
12"—2-ft. from butt	6-in.	45 to 49-ft.	.72	.....
12"—2-ft. from butt	6-in.	50 to 54-ft.	.77	.....
12"—2-ft. from butt	6-in.	55 to 59-ft.	.81	.....
14"—2-ft. from butt	6-in.	60 to 64-ft.	.87	.....
14"—2-ft. from butt	6-in.	65 to 69-ft.	.92	.....
14"—2-ft. from butt	6-in.	70 to 74-ft.	1.02	1.07
14"—2-ft. from butt	6-in.	75 to 79-ft.	1.07	1.07
14"—2-ft. from butt	5-in.	80 to 84-ft.	1.17	1.10
14"—2-ft. from butt	5-in.	85 to 89-ft.	1.27	1.15/1.20

* Pine piling over 90 feet available only in limited quantities; § ASTM Class B a, trucked in from N. J.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:

		6" x 8" x 8' Untr.	6" x 8" x 8' Tr.	7" x 8" x 8'6" Untr.	7" x 8" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.50	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak		3.00a		4.50a
New York	S. L. Sap Pine	2.50	4.00	3.00	5.00
	Mixed Oak	2.50	4.00	3.00	5.00
Philadelphia	Red Oak	2.85/4.05	4.40/4.60	3.20/3.40	4.40/4.60
St. Louis	Mixed Oak	2.65	3.40a	2.90A	3.75aA
San Francisco	Douglas Fir	2.72e†	3.84e†	3.64e†	5.05ea

Tr.—Treated; Untr.—Untreated. a Creosoted. e Empty cell. e Green f.o.b. cars. g 7 x 9 x 8' 6" * Add 75c/tie freight charge to Birmingham. •h 7" x 9" x 9 1/2"

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works	.11
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, f.o.b. works, ton	31.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	2.65
Soda ash, 58%, in paper bags, per 100 lb. dense	1.90
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	2.05
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	21.20

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, MARIE MORAVSIK, ELAINE CHOMYAK, ELIZABETH WERRA, ELEANOR QUERET, Reports, J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

R. I., Providence—OFFICE, etc.—BA 4/28—City, City Hall, office and garage. Approx. $900,000. Plans deposit $50. Creer, Kent, Cruise & Aldrich, 423 Industrial Bank Bldg., archts. CD 3/11.

HEAVY CONSTRUCTION—LB & CA

▲ MAINE—State Hy. Comn., Augusta,
The Bridge Constr. Corp., 283 Water St., Augusta, Me., CA $1,193,442 (5 bidders), b. conc. road 3.697 mi. City of Bangor, FAP No. I-95-B (8) 177, Penobscot Co. Bids Apr. 8. CD 3/31.

▲ VERMONT—State Dpt. Hys., State House, Montpelier,
Lane Constr. Corp., 965 E. Main St., Meriden, Conn. CA $2,329,303, drainage, sub-base, c. conc. 2.627 mi. Int. Hy. 89, Contr. 1 Proj. 1089-2 (5), Middlesex-Waterbury. Bids Apr. 3. CD 4/8, under LB.

▲ VERMONT—State Dpt. Hys., State Office Bldg., Montpelier,
A. E. Williams Constr. Co., Inc., 4 Locust St., Hartford, Conn., CA $1,151,307, est. $1,150,000, drainage, sub-base with b. conc. surf. course, Town of Waterbury; Int. Rte. 89 beginning approx. 0.835 mi. N.W. of Waterbury-Middlesex Town Line and exten. N.W. 1.494 mi. I 89-2 (5) Contr. 2, Middlesex and Waterbury. Bids Apr. 10. CD 3/18.

▲ MASSACHUSETTS—Commonwealth of Mass., Metropolitan Dist. Comn., Parks Dpt., 20 Somerset St., Boston. Bids opened 4/8.
Beacon Constr. Co., Inc., 100 Hano St., Allston, Mass., LB $1,049,836, reconstr. Longfellow bridge over Charles River, Contr. 1127, Cambridge-Boston. CD 3/13.

BUILDINGS—LB & CA

▲ E. J. Pinney Co., Inc., 220 Dwight St., Springfield, Mass., LB $1,574,800 Base Bid, LB $1,623,285 with alternates, SENIOR HIGH SCHOOL, EAST LONGMEADOW, MASS. Town, East Longmeadow, Mass. Bids Apr. 9. CD 3/17.

▲ Grande & Son, Inc., 175 Maplewood Ave., Malden, Mass., LB $1,090,402, est. $1,000,000, HOUSING for the ELDERLY, EVERETT, MASS. City Housing Auth., 17A Drive, Everett, Mass. Bids Apr. 9. CD 3/19.

▲ H. E. Cline Constr. Co., 51 Winchester St., Newton, Mass. Owner Builds, $1,000,000, Haverhill Plaza BOWLING CENTER, HAVERHILL, MASS. American International Bowling Corp., lessee.

▲ James S. Kelliher, 1245 Hancock St., Quincy, Mass., CA Est. $1,000,000, MONASTERY, West Andover, LOWELL, MASS. Poor Clare's Monastery, Chancery Office, 1 Lake St., Brighton, Mass. (Correction—contractor name.) CD 2/20, under CA.

▲ N. D. C. Constr. Co., Inc., 124 Shawmut Ave., Boston, Mass., CA $1,754,187, est. $1,700,000, SENIOR HIGH SCHOOL, Old Conn. Path, WAYLAND, MASS. Town, Supt. Schools, Town Office Bldg., Wayland, Mass. Bids Mar. 31. CD 4/3, under LB.

▲ J. L. Marshall & Sons, Inc., 560 York Ave., Pawtucket, R. I., LB $1,121,916, 2 DORMITORIES, Pembroke College Proj. RI-37-CH-9 (D), PROVIDENCE, R. I., Brown University, Prospect St., Providence, R. I. Bids Apr. 9. CD 3/6.

▲ South Windsor Constr. Co., Inc., South Windsor, Conn., Owner Builds, $2,402,500, 155 HOUSES, Section B, "Bel Aire Estates", Fishtown Rd., Owner Builds, $1,348,500, 88 HOUSES, Section A, "Bel Aire Estates", Fishtown Rd., GROTON, CONN. CD 4/8.
Garry Building Corp., Crossroads Plaza, West Hartford, Conn., Owner Builds, $860,000, 61 HOUSES, "West Ridge Park", Texas Drive, NEW BRITAIN, CONN.

▲ F. M. Floryan & Co., Inc., and Edwards Constr. Co., 64 Edwards St., Hartford, Conn., CA Approx. $5,000,000, 603,305 sq. ft. SHOPPING CENTER, North Colony Rd., WALLINGFORD, CONN. Food Fair Properties, 99 Park Ave., New York, N. Y. Awarded Apr. 6. CD 8/28.

MIDDLE ATLANTIC

▲† Great Lakes Dredge & Dock Co., Morgan Bldg., Buffalo, N. Y., LB $4,918,600, est. $6,401,630 (second phase), Buffalo Harbor Improvs., CIVENG 30-023-59-38, NEW YORK, U. S. Eng., Engineer Park, Buffalo 7, N. Y. Bids Apr. 9. CD 3/23.

▲ Charles F. Vachris, Inc., 9024 Ditmas Ave., Brooklyn 36, N. Y., CA $4,787,500, Contr. 30d1, substructure shipping terminal, foot of 39th St., Gowanus Bay, Brooklyn Boro, BROOKLYN, N. Y. Corps Marine & Aviation, Rm. 304 Battery Maritime Bldg., foot of Whitehall St. (South Ferry), New York 4, N. Y. Bids Mar. 11. CD 3/19, under LB.

▲ E. S. Albrecht Co., 2626 W. 26th St., Chicago, Ill., CA $2,149,755, Contr. 460, stream control works and portions of release water structures for proposed Cannonsville Dam, NEW YORK, N. Y. Bd. Water Supply, 13th Floor, 120 Wall St., New York, N. Y. Bids Feb. 24. CD 2/26, under LB.

Plymouth Electric Co., 100 Indiana Ave. N. W., Wash., D. C., CA $893,000, conversion electrical installations in Library of Congress, incl. general construction work, WASH., D. C. Office of Architect of the Capitol, U. S. Capitol, Wash., D. C. Bids Mar. 31, awarded Apr. 8. CD 4/7, under LB.

BUILDINGS—LB & CA

Planet Constr. Corp., 11 W. 42nd St., New York 36, N. Y., CA $986,000, general contract, addn. and modernization existing JUNIOR HIGH SCHOOL 141, 21st Ave. and 37th St., ASTORIA, N. Y. Supt. School Bldgs., Bureau Constr., 4th Floor, 42-15 Crescent St., Long Island City 1, N. Y. Bids Feb. 17. CD 2/19, under LB.

▲ Walter A. Stanley Constr. Co., Railroad Ave., Ossining, N. Y., CA $2,146,000, ANIMAL HUSBANDRY, incl. service connections, New York State College, ITHACA, N. Y. Bureau Contracts, Dpt. P. Wks., 12th Fl., State Office Bldg., Albany, N. Y. Bids Feb. 11. CD 2/17, under LB.

▲ John J. Campagna, 654 Madison Ave., New York 21, N. Y., Owner Builds, $2,000,000, 19 story APARTMENT, 201-7 E. 63rd St., corner 3d Ave., NEW YORK, N. Y. Paul Resnick, 654 Madison Ave., New York 21, N. Y., archt. CD 3/24.

▲ Colmar Constr. Co., 364 Gold St., Brooklyn 1, N. Y., CA $1,617,000, general contract PUBLIC SCHOOL 100, Lafayette Ave. between Taylor and Thierot Aves., Bronx Boro, NEW YORK, N. Y. Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City 1, N. Y. Bids Mar. 18. CD 3/20, under LB.

▲ Dworman Assocs., 400 Park Ave., New York, N. Y., Owner Builds, $2,000,000, 20 story APARTMENT, 959-969 Third Ave. southeast corner 58th St., CD 12-22; Owner Builds, $885,000, APARTMENT, 143-55 East 55th St., NEW YORK, N. Y. Paul Resnick, 654 Madison Ave., New York 21, N. Y.; archt. CD 1/26.

▲ George L. Rabinor, c/o S. J. Kessler & Sons, archts., 551 Fifth Ave., New York 17, N. Y., Owner Builds, $2,800,000, 14 story APARTMENT, southwest corner Third Ave. and East 18th St., NEW YORK, N. Y. CD 4/6/56.

Rudin Contg. Co., 371 E. 135th St., New York 54, N. Y., CA $821,400, general constr. PUBLIC SCHOOL 171, East 103d St. and Madison Ave., NEW YORK, N. Y. Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City 1, N. Y. Bids Mar. 24. CD 3/26, under LB.

▲ Irving Jungreis, Chester Rd., Ironia, N. J., CA $1,000,000, 50 HOUSES, to be known as Georgian Estates, Rte. 533, Randolph Twp., IRONIA, N. J. Georgian Estates, Chester Rd., Ironia, N. J. Henry Vreeland, 4 Court St., Morristown, N. J., archt.

▲ Prospect Homes, Inc., c/o Roy Lipson, Blue Hill Rd., River Vale, N. J., Owner Builds, $2,000,000, 92 HOUSE DEVELOPMENT, South Orangeburg Rd., RIVER VALE, N. J.
Alex. Wojciechowicz, State Hy. 35, Wanamassa, N. J. Owner Builds, $825,000, 48 HOUSES, Sunset Ave., Ocean Twp., WANAMASSA, N. J.

▲ Reisinger Bros., Inc., Box 516, Carlisle, Pa. LB $1,679,000, (10 bidders), general contract, JUNIOR-SENIOR HIGH SCHOOL for Lower Dauphin Jt. School Dist., HUMMELSTOWN, PA. Pa. Pub. School Bldg. Auth., 101 S. 25th St., Harrisburg, Pa. Bids Apr. 7. CD 3/11.

▲ Post Office Terminal Annex Bldg. Corp., 1620 W. Thompson St., Phila., Pa., LB $2,070,000, GARAGE to be built according to post office specifications (lease to Govt. for 30 years), PHILA., PA. Post Office Dpt., 30th St. Post Office, Phila., Pa. Bids Apr. 9. CD 1/26.

▲† Norair Engineering Corp., 1118-22nd St. N. W., Wash., D. C., CA $2,882,577, two LABORATORIES, HEATING PLANT and SUPPORT BLDGS. at Space Center, BELTSVILLE, MD. National Aeronautics & Space Admin., 1520 H St. N. W., Wash., D. C. Bids Mar. 25. CD 3/27, under LB.

SOUTH

BUILDINGS—BA

▲ Ky., Louisville—PLANT—BA 5/5—Falls Cities Cooperative Milk Producers Assn., 1501 E. Main St., 1-2 story, 150 x 225 ft., reinforced and precast concrete milk processing plant, Benchel Bank Rd. $1,000,000. Plans deposit $35. D. X. Murphy & Bros., 707 Louisville Trust Bldg., Zone 2, archts. E. P. Ronald & Assoc., 554 S. 3d St., Zone 2, engrs. CD 2/9.

HEAVY CONSTRUCTION—LB & CA

▲ NORTH CAROLINA—State Hy. Dpt., Raleigh,
N. C.—Ray D. Lowder, Inc., Albemarle, N. C., CA $1,012,483, grading 9.53 mi. Hy. Proj. 8.14773, Wake Co. CD 4/6, under LB.
N. C.—Thompson-Arthur Paving Co., Box 1197, Greensboro, N. C., CA $1,319,035, grading, SABC and b. conc. binder and surf. 11.19 mi. surf. on additional lane of Interstate Rte. 85 between Greensboro and N. C. Rte. 61, Proj. 8.15417 I-85-3 (11) 125, Guilford Co.;
N. C.—Clinchfield Concrete Co., Inc., Kingsport, Tenn., CA $2,906,182, CABC 9 in. concrete paving and roadside rest station, 15.01 mi. surf. Interstate Rte. 40 between Morganton and Hildebran, Proj. 8.18187 1-40-2 (20) 106, F-700 (23) Burke Co. Grand total $5,237,700. CD 4/6, under LB.
NORTH CAROLINA—State Hy. Dpt., Raleigh,
Wilson Constr. Co., Box 603, Salisbury, N. C., CA $915,904, structures 9.53 mi. from point 1.5 mi. southeast of Apax, northeast across country to point approx. 0.52 mi. south of US 1, near Method, Proj. 8.14773, Wake Co. Bids Mar. 31, awarded Apr. 8. CD 4/6, under LB.
GEORGIA—State Hy. Dpt., 2 Capitol Sq. S.W., Atlanta
W. L. Cobb Constr. Co., Box 410, Decatur, Ga., CA $814,539, grading and 4-lane paving b. conc. 5.442 mi. at Statesboro, SR 67-F-005-5 (3) SR 26, Bulloch Co. Bids Dec. 19. CD 12/24, under LB.

▲ GEORGIA—State Hy. Dpt., 2 Capitol Sq. S.W., Atlanta,
Hugh Steele Constr. Co., Box 198, Centre, Ala., CA $4,426,031, grading and divided lane paving 6.306 mi., 6 bridge culverts on SR 29 to Old U. S. 41 Rd. 1-1N-407-1 (2) CT 1 1-1N-28-1 (9) New Fulton and Clayton Counties. Bids Feb. 20. CD 2/13.

▲ GEORGIA—State Hy. Dpt., 2 Capitol Sq. S.W., Atlanta,
Ga.—MacDougald Constr. Co., Box 1655, Atlanta, Ga., CA $7,995,960, divided lane grading and paving, 12 hy. grade separation structures and 1 railroad grade separation structure, 7.399 mi. Atlanta Augusta Freeway, Fed. Aid Proj. No. 0-20-2 (6) 58 1-402-2 (6) (old) Fulton and Dekalb Counties. Bids Oct. 10. CD 11/5, under LB.
Ga.—Henry Newton Co., Box 428, Decatur, Ga., CA $2,176,462, relocating Washington St., wid'n. Clark St., raising Capitol Ave. and constr. 5 hy. grade separation structures at intersection of Atlanta North-South Expressway and future Birmingham-Atlanta-Augusta Expressway, Fed. Aid Proj. No. I-75-2 (13) 251 CT 1 1-4012 (13) "old" Fulton Co. Bids Oct. 10. CD 10/15, under LB.

▲ FLORIDA—State Rd. Dpt., Tallahassee,
B. B. McCormick & Sons, Box 248, Jacksonville Beach, Fla., CA $1,073,623, 2-lane 10½ limerock base, b. conc. surf. course and binder, two 201 ft. highway grade separation bridges, 3.440 mi. SR 8 FAI Proj. No.

(Continued on page 73)

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000, other public works $88,000, industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of interest to American contractors.

By Regions & Classes of Construction
(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England — Middle West
Middle Atlantic — West of Mississippi
South — Far West

PROPOSED WORK
Water Supply — Public Buildings
Sewers, Waste Disposal — Mass Housing
Bridges — Commercial Buildings
Streets & Roads — Industrial Buildings
Earthwork, Waterways — Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.

BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

SPECIFY RODNEY HUNT
HY-Q FLUSH-BOTTOM SLUICE GATES
and get these **6** design advantages

#1

HY-Q® Sluice Gates Assure Maximum Flow

FIG. 1

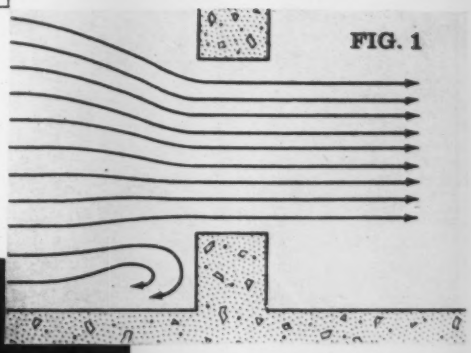
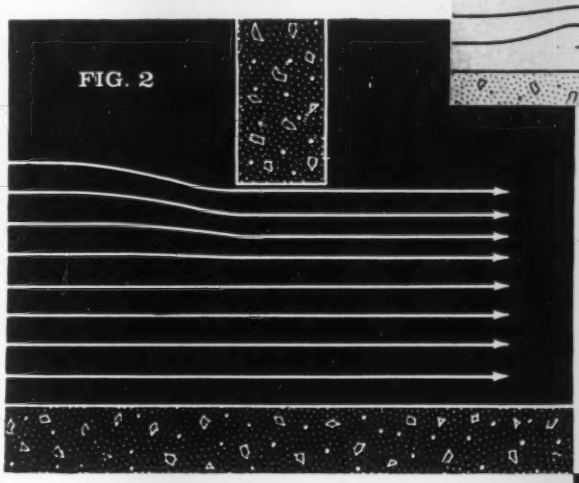
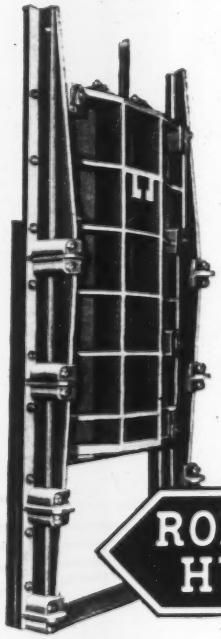


FIG. 2

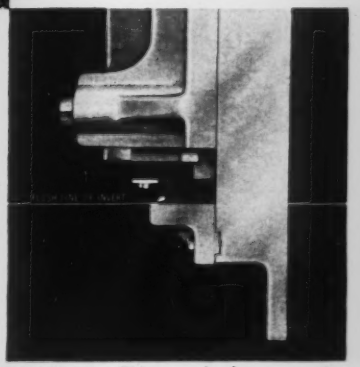


The vertical wall required with conventional gates (Fig. 1) sets up turbulence and impedes maximum flow when the gate is opened. If mounted with the bottom flush with the invert, the deep pocket required for the bottom wedges creates similar turbulence. The Rodney Hunt HY-Q design (Fig. 2) has neither sill nor pocket to create turbulence. Result — smoothest, highest flow possible. At the bottom of the gate, the HY-Q design provides a flush surface with no impediment to maximum flow.



The many advantages of the Rodney Hunt HY-Q Sluice Gate derive from the design of the resilient seal fastened to the bottom of the disc as illustrated here. This seal extends the full width of the disc and provides a cushioned closing at the stop bar *flush with the invert*. This flush bottom closure assures—1. maximum flow—2. complete drainage without pumps or piping—3. elimination of silt and debris problems—4. maximum hydraulic gradient—5. lowest possible invert and—6. construction economy.

In brief, the HY-Q design offers unmatched design flexibility and construction economy for water control projects... with hundreds of gate sizes available from 6" x 6" to 144" x 144" and larger to meet your specific design requirements.



HY-Q The sluice gate with flush-bottom closure

RODNEY HUNT

HY-Q SLUICE GATE
a product of
RODNEY HUNT MACHINE CO.
Water Control Equipment Division
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Serving water control engineers with equipment and engineering

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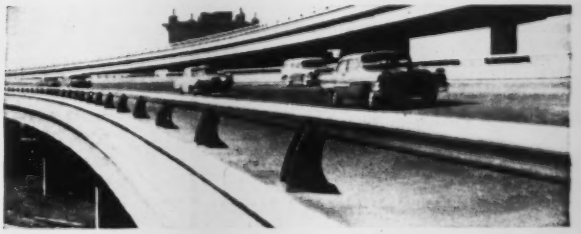
Alcoa's new aluminum beam guard rail for highways combines maximum safety with modern appearance and minimum upkeep. Fabrication from high-strength aluminum alloys assures increased energy absorptive capacity.

Alclad aluminum provides permanent resistance to corrosion and means direct savings in maintenance costs. It resists the corrosive effects of road salts, industrial fumes and airborne grit. No painting—on or after installation—is necessary. Initial cost, only slightly higher than ordinary guard rail, is rapidly equalized by the savings in painting and other maintenance. Alcoa® Beam Guard Rail is available with aluminum posts, too.

Now is the time to get the full story on Alcoa Beam Guard Rail, Lighting Standards, Highway Signs, Overhead Structures and Chain Link Fencing. To learn how they help stretch taxpayers' highway dollars, call your nearest Alcoa sales office or write: Aluminum Company of America, 1910-D Alcoa Building, Pittsburgh 19, Pennsylvania.

BRIDGE RAILINGS of Alcoa Aluminum deliver maximum return for tax dollars, because first cost is last cost. Lightweight aluminum is easier to handle and faster to erect. Corrosion-resistant Alcoa alloys never need maintenance; they end painting costs that commonly run to a dollar per lineal foot per year.



OVERHEAD SIGN STRUCTURES eliminate periodic maintenance and the accompanying traffic tie-ups when they're built of Alcoa Aluminum. Tubular truss designs and single-chord spans meet any requirement and their lightness permits faster erection with minimum man power and equipment.

ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

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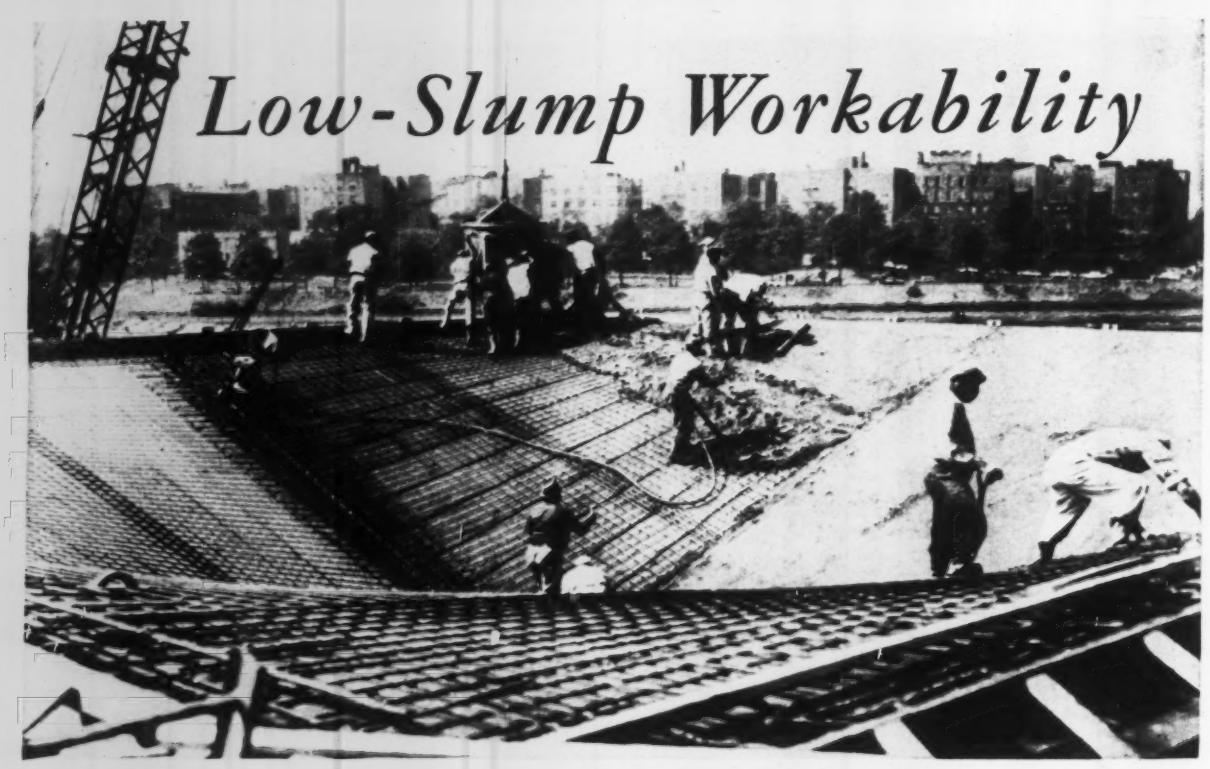
Low-Slump Workability



This hyperbolic paraboloid, spanning 60 feet, is one of six for the new library of Hunter College, New York City.

Architect:
MARCEL BREUER, FAIA
Consultant: Eduardo Catalano
Associate: Robert F. Gatje
Consulting Structural Engineers:
FELIX CANDELLA; FARKAS & BARRON
General Contractor:
LEON D. DeMATTEIS & SONS, INC.
Concrete Contractor:
DIC CONCRETE CORP.

...with PLASTIMENT

The problem, to place lightweight Lelite concrete on steep slopes — as much as 45° — for the 3½ in. thick hyperbolic paraboloid roof of the new Hunter College library . . . Good workability at low slumps and a cohesive mix were vital . . . Plastiment retarding densifier, added to the mix, gave the desired workability at 2-inch slumps, and rapid clear-water bleeding for stability on steep slopes, resulting in sound concrete . . . Strengths of 3000 psi were obtained in 7 days.

Plastiment controls the hydration of cement by retarding and reducing cement gel formation . . . It does not entrain air so that proportions can be varied to meet job conditions . . . Workability is greatly increased so that even stiff mixes are readily compacted . . . In addition, it reduces cracking, increases strength and provides more uniformity in a concrete member.

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EXPERIENCE
•
SERVICE

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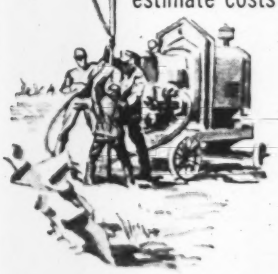
JOB
let Griffin
analyze your ground
water problem and
estimate costs



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1839 South Wall Street, Columbus 7, Ohio
Columbus, Ohio Greenville, Ohio Chicago, Illinois
Write for Bulletin X-541

(Continued from page 68)

1-10-5 (9) 344, Job. No. 72270-3404, Duval Co. Bids Dec. 16, awarded Apr. 8. CD 12/19, under LB.

† Colsen Constr. Co., 840 W. 25 St., Norfolk, Va., LB $988,998, ship and aircraft fueling facilities, U. S. Naval Aux. Air Station, NBy-18506, MAYPORT, FLA. P. Wks. Officer, Naval Base, S. C.

▲† M. T. Reed Constr. Co., 162 Millsaps Ave., Jackson, Miss., LB $2,975,000, cadet quarters, enlisted men's barracks and subsistence bldg., U. S. Naval Auxiliary Air Station, NBy-21843, MERIDIAN, MISS. Dist. P. Wks. Office, Sixth Naval Dist. Bldg. No. 13, U. S. Naval Base, Charleston, S. C. Bids Apr. 9. CD 3/6.

† McWilliams Dredging Co., Box 584, New Orleans, La., CA $851,067, outflow channel dredging, Concordia Parish, Inv. No. CIVENG-16-047-59-147, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Mar. 19. CD 3/26, under LB.

▲ KENTUCKY—Commonwealth of Ky., Dpt. Hys., Frankfort:

Breslin Constr. Co., 1433 S. Preston St., Louisville, Ky., CA $1,074,112, high type surf. 4.964 mi., Elizabethtown-Louisville Rd. F 79 (25), Hardin Co. Bids Apr. 3, awarded Apr. 6. CD 4/9, under LB.

▲ Louisville & Nashville R. R. Co., H. C. Forman, ch. engr., Broad St., Louisville, Ky., Owner Builds, $2,200,000, re-locate railroad tracks between Old Washatchie Pike and Lookout Creek, Hamilton Co., TENNESSEE. CD 1/16/57, under Tenn., Chattanooga.

▲† Kaminer Constr. Corp., Chamblee, Ga., CA $1,131,680, dessicant drier sys. for Propulsion Wind Tunnel, Arnold Engineering Development Center, TULLAHOMA, TENN. U. S. Eng., Tullahoma, Tenn. CD 4/3, under LB.

BUILDINGS—LB & CA

Frank H. Conner Co., 711 S. Tryon, Charlotte, N. C., CA $927,515, HOSPITAL, BANNER ELK, N. C. Grace Hartley Memorial Hospital, Banner Elk, N. C. CD 3/30, under LB.

▲ G. E. Bass & Co., 2715 N. State St., Box 1033, Jackson, Miss., LB $2,569,033 (5 bidders) 270 low rent HOUSING UNITS, in Lincoln Park and Burnside Projects, HUNTSVILLE, ALA. Huntsville Housing Auth., City Hall, Huntsville, Ala. Bids Apr. 7. CD 3/13.

Alabama-Louisiana Builders, 2915 Carter Hill Rd., Montgomery, Ala., Owner Builds, $800,000, 80 RESIDENCES, MONTGOMERY, ALA.

▲ Flint Goodridge Hospital, Louisiana Ave. and LaSalle St., New Orleans, La., rejected bids Feb. 3, hospital addn., NEW ORLEANS, LA. LB $1,375,000. Goldstein, Parham & Labouisse, American Bank Bldg., New Orleans, La., archts. CD 2/6, under LB.

▲ Foster-Creighton Co., 724 1st American National Bank, Nashville 3, Tenn., CA $8,935,000, HOSPITAL CLINIC, AMBULANT WING, NURSES HOME and paving, University of Kentucky, LEXINGTON, KY. Commonwealth of Ky., Div. Purchases, Frankfort, Ky. Bids Mar. 25. CD 3/27, under LB.

F. T. Thayer, Jr., Contractor, 189 Scott St., Memphis, Tenn., CA Est. $900,000, CHURCH, MEMPHIS, TENN. Idewild Presbyterian Church, c/o contractor.

MIDDLE WEST

BUILDINGS—BA

▲ Wis., Madison—OFFICE—BA About 5/15—Cuna Mutual Insurance Society, 1617 Sherman Ave., 4 story, 54 x 211 ft. office, $1,000,000. Kaeser & McLeod, 3407 Circle-Close Dr., archts. CD 3/5/58.

HEAVY CONSTRUCTION—LB & CA

▲ Spencer White & Prentice, 10 E. 40th St., New York, N. Y., LB $1,090,228 (5 bidders) Stage 2, 80-78-59-1, Navy Pier, imprvs., rehabilitation existing transit shed, 1,100 ft. underpinning fdns. and track relocation, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago 2, Ill. Bids Apr. 7. CD 3/19.

BUILDINGS—LB & CA

▲ Knowlton Constr. Co., Box 348, Bellefontaine, O., CA $2,114,000, general contract 1 and 2 story, structural steel, brick HIGH SCHOOL, NEWARK, O. Bd. Educ., Newark, O. Bids Mar. 11. CD 3/18, under LB.
Gesling Co., 121 S. Columbus St., Lancaster, O., CA $768,800, plumbing, heating and ventilating HIGH SCHOOL, Newark, O.

▲ Roediger Constr. Co., 1729 Superior Ave., Cleveland, O., LB $3,250,000 (3 bidders), general contract HOSPITAL, PARMA, O. Parma Community Hospital, 7441 W. Ridgewood Dr., Parma, O., Bids Apr. 4. CD 3/17.
Gorman-Lavelle Plumbing & Heating, 2341 East 22nd St., Cleveland, O., (5 bidders) LB $1,011,110 (combined) heating, ventilating, plumbing and air-conditioning, hospital (Parma, O.).
Standard Electric, 27900 Kinsman Rd., Cleveland, O., LB $420,000 (5 bidders), electrical work hospital (Parma, O.).

▲ Brown Constr. Co., 3334 Prospect Ave., Cleveland 15, O., LB $1,663,140, general contract West Lake County Unit HOSPITAL, WILLOUGHBY, O. Lake County Memorial Hospital, Painesville, O. Bids Apr. 7. CD 3/9.
Feldman Bros. Co., 2322 Prospect Ave., Cleveland 15, O., LB $74,641 (9 bidders) mechanical work for West Lake County Unit of Hospital (Willoughby, O.).

▲ Harold Gunnarson Constr. Co., 5153 N. Clark, Chicago, Ill., CA Total est. $10,000,000, CANNED MEAT PLANT, CHICAGO, ILL. Libby McNeill & Libby, 200 S. Michigan Ave., Chicago 4, Ill. Bids Mar. 23. CD 3/19.

▲ Sjostrom & Sons, Inc., 718 7th Ave., Rockford, Ill., CA $1,626,400, general contract SENIOR HIGH SCHOOL, ROCKFORD, ILL. Bd. Educ., 201 S. Madison St., Rockford, Ill. CD 4/6, under LB.

(Continued on page 75)

4-D

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Independent leveling and two-way lock. A single hydraulic cylinder located in the beam moves in and out quickly. "A" indicates two wedge locks that take over when beams are positioned. No hydraulic pressure needed to hold outriggers in extended position.

(Continued from page 73)

▲ A. Grignago Co., 802 E. Olin Ave., Madison, Wis., CA $1,670,768, general contract SCHOOL and COTTAGES, WALES, WIS. State Dpt. P. Welfare, Madison, Wis. Bids Mar. 3. CD 3/10, under LB.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

▲† Minn., Duluth—BOMARC FACILITIES—BA. About 5/14—U. S. Eng., 1217 U. S. Post Office & Custom House, St. Paul 1, Minn.: bomarc facilities, IM 99-B near here, ENG-21-018-59-27. CD 2/13.

▲ Tex., Jacksonville—BA 5/15—Upper Neches River Municipal Water Auth., K. A. Anderson, pres., Jacksonville. Stage 2 of Blackburn Crossing Reservoir (a dam-lake creating 46 m.g. daily supply to cities Jacksonville, Rusk and Palestine) 9 mi. N. W. of here and also near Frankston. $1,800,000. Forrest & Cotton, Vaughn Bldg., Dallas, engrs. CD 10/8/57.

BUILDINGS—BA

▲ Neb., Omaha—SCHOOL—BA 4/28—School Dist. 66, 8727 Shamrock Rd., Westbrook Junior High School, $1,000,000. Leo A. Daly Co., 633 Ins. Bldg., archts. CD 2/9.

▲ Colo., Greeley—PLANT—BA 4/30—Greeley Capitol Packing Co., 5000 Clarkson, Denver, 1 story, bsmt., 80 to 100,000 sq. ft. packing plant, $1,000,000. Extended date. Nat S. Sachter & Rex E. Scott, 4950 E. Evans, Denver, archts. Riley Engineering, 810 23 Denver, mech. engr. Sallada & Hanson, 1623 E. 17 Ave., Denver, structural engrs. Sol Flax, 640 Sherman, Denver, electrical engr. CD 3/31.

▲† Mo., St. Louis—FEDERAL OFFICE—BA 6/16—General Services Admin., P. Bldgs. Service, 2306 E. Banister Rd., Kansas City 10, Mo., 4 story, bsmt., sub-bsmt., 485,000 sq. ft., air-conditioned federal office, Market, Walnut, 15th and 16th Sts. $11,641,000. William B. Ittner, Inc., 428 Bd. Educ. Bldg., 911 Locust St., Zone 1, and Murphy & Mackey, 6124 Enright Ave., Zone 12, archts. CD 7/29.

BUILDINGS—SLC

▲ Kan., Hutchinson—WAREHOUSE, etc.—J. S. Dillon & Sons Stores Co., Inc., 307 N. Washington St., soon lets contract 144 x 262 ft. warehouse addn.; 120 x 172 ft. office area, etc., East 4th St. $1,125,000. McCracken, Miller, Hiett, Hackett & Dronberger, 825 N. Main St., archts. CD 11/17.

▲ Kan., Winfield—DORMITORY, etc.—Southwestern College, Bd. Trustees, Winfield, soon lets contract, Unit (A) 2 story married students apartments; Units (B and C), 1 story, steel frame, limestone married students apartments, 3 story, limestone women's dormitory, 2 story student center. $1,080,000. Buck Assocs., 1806 Hillcrest Dr., Bartlesville, Okla., archts.-engrs. CD 12/31/56.

HEAVY CONSTRUCTION—LB & CA

▲ Cain & Cain, 4001 N-S Expressway, Fort Worth, Tex., LB $1,766,500, est. $1,810,000, (6 bidders) comb. bid: reinf.-con.; steel stadium, LUBBOCK, TEX., Texas Technological College, Lubbock, Tex. Bids Apr. 10. CD 3/25.

† V&N Constr. Co., 202 37th St., Lubbock, Tex., CA $944,132, 418 units Wherry Housing rehabilitation and imprv. Reese Air Force Base. Proj. N-A Inv. No. 41-620-59-19, LUBBOCK, TEX. Procurement Office Bldg. T-151, Reese Air Force Base, LUBBOCK, Tex. Bids Mar. 31. CD 4/8, under LB.

BUILDINGS—LB & CA

▲ Swedberg Constr. Co., Detroit Lakes, Minn., LB $2,273,749 (8 bidders), general contract 34-bed HOSPITAL addn., LITTLE FALLS, MINN. St. Gabriel's Hospital, Sisters St. Francis, Little Falls, Minn. Bids Apr. 7. CD 3/12.

P. J. Gallagher & Sons Co., 16 East Third St., Faribault, Minn., LB $794,640 (6 bidders), mechanical work 34-bed HOSPITAL addn., (Little Falls, Minn.).

▲ C. Rallo Contg. Co., Inc., 5000 Kemper Ave., St. Louis 9, Mo., CA $1,340,000, general contract 2 and 3 story, brick, masonry block, steel, concrete HIGH SCHOOL, Redman Ave. east Bellefontaine Rd., ST. LOUIS COUNTY, ZONE 38, MO. St. Louis Archdiocese Bldg. Comm., 4196 Lindell Blvd., St. Louis 8, Mo. Bids Mar. 5. CD 3/17, under LB.

▲† U. S. Eng., 1800 Federal Office Bldg., 911 Walnut St., Kansas City 6, Mo., cancelled bids to have been opened Apr. 8, 200 units Capehart HOUSING (3), ENG-23-028-59-43, FORT LEAVENWORTH, KAN. $3,000,000. CD 4/3.

▲ M. H. R. Constr. Co., c/o owner, CA Est. $1,000,000, OFFICE, 3333 Fannin St., HOUSTON, TEX. Phil Rich & Son, 2900 Caroline St., Houston, Tex. Southern Bell Telephone Co., lessee Jos. Krakower, 505 Avondale St., Houston, Tex.; archt. W. S. Merliss & Assocs., 2472 Bolsover St., Houston, Tex.; engrs. CD 4/10.

▲ H. F. Hustad, Billings, Mont., CA Est. $2,000,000, design and construct 120,000 sq. ft. L-shaped SHOPPING CENTER with 900 car parking area, 10 acre site, BILLINGS, MONT. Buttrey Foods Inc., 601 6th St. W., Great Falls, Mont. Awarded about Apr. 9.

FAR WEST

BUILDINGS—BA

▲ Calif., Antioch—SCHOOL—BA 5/6—Antioch Unif. School Dist., 20th and A Sts., 70,600 sq. ft. prestressed concrete Park Junior High School, D. and Putnam Sts., $1,000,000. Plans deposit $25. John Lyon Reid & Partners, 1019 Market St., San Francisco, archts.

▲ Calif., Sacramento—ENGINEERING—BA 5/12—State Div. Architecture, 1120 N. St., 1 story 68,000 sq. ft. engineering bldg., Sacramento State College, W. O. 4005GC-38. $1,275,000. Plans deposit $100. CD 1/6/58.

HEAVY CONSTRUCTION—LB & CA

▲ IDAHO—State Hy. Dpt., Boise,
Morrison-Knudsen Co., Inc., 319 Broadway Ave., Boise, Idaho, CA $2,171,771, 4-lane divided roadway, drainage structures, plant mix bit. surf., 162 ft. concrete underpass, 90 ft. twin bridge on 4.317 mi. Interstate No. 90, Kootenai Co. Bids Mar. 24, awarded Mar. 27. CD 3/30, under LB.

▲ CALIFORNIA—Div. San Francisco Bay Toll Crossings, 151 Fremont St., San Francisco,
Peter Kiewit Sons' Co., 442 Post St., San Francisco, Calif., CA $1,572,166, Stillman St. Ramp (upper deck revisions, approach roadways to lower deck and bridge, incl. electrical and mechanical facilities) San Francisco-Oakland Bay Bridge reconstr., San Francisco, San Francisco Co. Bids Apr. 7, awarded Apr. 10. CD 4/13, under LB.

CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles. Bids opened 4/9.
Osborn & Pierson, Inc., 1443 Edgecliff Lane, Pasadena, Calif., LB $995,957 (9 bidders), 1,112 ft. bridge over Colorado River, U. S. Hy. 60-70 about 30 mi. east of Blythe, welded steel girder structure to provide 2 lane roadway just north of present bridge which will be removed when new one built, XI-RIV-64-F, Riverside Co. CD 3/4.

▲ CALIFORNIA—State Div. Hys., 1120 N. St., Sacramento. Bids opened 4/8.
Gordon H. Ball and Gordon H. Ball, Inc., 3000 Camille Ave., Danville, Calif., LB $1,392,945 (9 bidders) paving 13.7 mi. previously graded roadway, State Hy. Rte. 90 between Putah Creek east of Winters and County Rd. 19 north of Madison to provide initial 2 lanes of future 4 lane freeway, 111-Yol-6-A, B Win. D., Yolo Co. CD 3/11.

▲ Fruin-Colnon Co., 48 Park Rd., Burlingame, Calif., LB $1,557,270, (7 bidders), Upper American River Proj., 150 ft. high, concrete arch Junction Dam and Jaybird Tunnel Intake and other pertinent features, El Dorado Co., Inv. 2207, SACRAMENTO, CALIF. Sacramento Municipal Utility Dist., Eng. Dpt., 59th and R Sts., Sacramento, Calif. Bids Apr. 9. CD 3/18.

BUILDINGS—LB & CA

▲† Baker & Ford Co., Mason Bldg., Bellingham, Wash., LB $5,036,174 (9 bidders), 2 RADAR TRANSMITTER BLDGS. and related work for ballistic missile detector installation, Inv. 59-59, CLEAR, ALASKA. U. S. Eng., P. O. Box 7002, Anchorage, Alaska. Bids Apr. 10. CD 3/27, under LB.

▲ T. G. K. Constr. Co., 2750 W. McDowell St., Phoenix, Ariz., CA $1,500,000, design and construct 86,000 sq. ft. Deer Valley Park PLANT addn., PHOENIX, ARIZ. General Electric Co., Computor Div., 1103 N. Central Ave., Phoenix, Ariz. CD 2/3.

John E. Branagh & Son, 42 La Salle Ave., Piedmont, Calif., LB $998,700 (17 bidders), 3 story, 73,600 sq. ft., steel frame, concrete ENGINEERING SERVICE BLDG. at University Lawrence Radiation Laboratory, BERKELEY, CALIF. University of Calif., Admin. Bldg., Berkeley, Calif. Warnecke & Warnecke, 111 New Montgomery St., San Francisco, Calif., archt. CD 7/23/56.

▲ Chacksfield Constr. Co., 1346 W. 155th St., Gardena, Calif., Owner Builds, $1,396,055, 76 one and two story DWELLINGS, 170 St. and Dalton St., Tract 23505, GARDENA, CALIF.

Tom E. Norcross, 6053 Atlantic Ave., Long Beach 5, Calif., CA $887,000, 1 story INDUSTRIAL ARTS BLDG., Long Beach State College, W. O. 4160GC-81, LONG BEACH, CALIF. State Div. Architecture, 1100 S. Grand Ave., Los Angeles, Calif. Bids Apr. 1, awarded Apr. 7. CD 4/8, under LB.

▲ Jos. Bettancourt, 125 S. Lindon Ave., South San Francisco, Calif., CA $1,314,000, general contr., 93,000 sq. ft. JUVENILE UNIT, Napa State Hospital, incl., four 45 bed dormitories, school and recreational facilities, W.O. 4007GC-13, NAPA, CALIF. State Div. Architecture, 1120 N. St., Sacramento, Calif. Bids Mar. 24, awarded Apr. 8. (Former contractor refused job because of bid error). CD 4/6, under CA.

▲ Steed Bros. Constr. Co., Box 450 Alhambra, Calif., CA $4,275,600, 6 story reinf.-con. Holy Cross HOSPITAL, SAN FERNANDO, CALIF. Sisters of the Holy Cross, c/o Verge & Clatworthy, archts., 4442 Eagle rock Blvd., Los Angeles, Calif. Bids Mar. 26, awarded Apr. 7. CD 4/8, under LB.

▲ Steed Bros., 714 Date St., Alhambra, Calif., LB $1,884,000 (8 bidders), 2 story, 184 x 246 ft., 98,500 sq. ft. floor area, reinf.-con., brick, steel framed SPEECH-DRAMA BLDG. incl. 400 seat little theatre, San Fernando Valley State College, Northridge, W. O. 4005GC-61, SAN FERNANDO, CALIF. State Div. Architecture, 1100 S. Grand Ave., Los Angeles, Calif. Bids Apr. 8. CD 3/6.

CANADA

HEAVY CONSTRUCTION—BA

▲ Que., Montreal—SUBWAY—BA 5/6—City, City Hall, subway on Berri St. under Sherbrooke St. E. $1,250,000. Plans deposit $100. CR 11/27/46.

BUILDINGS—BA

▲ N. B., Saint John—PROVINCIAL—BA 4/4—Provincial Dpt. P. Wks., Parliament Bldgs., Fredericton,

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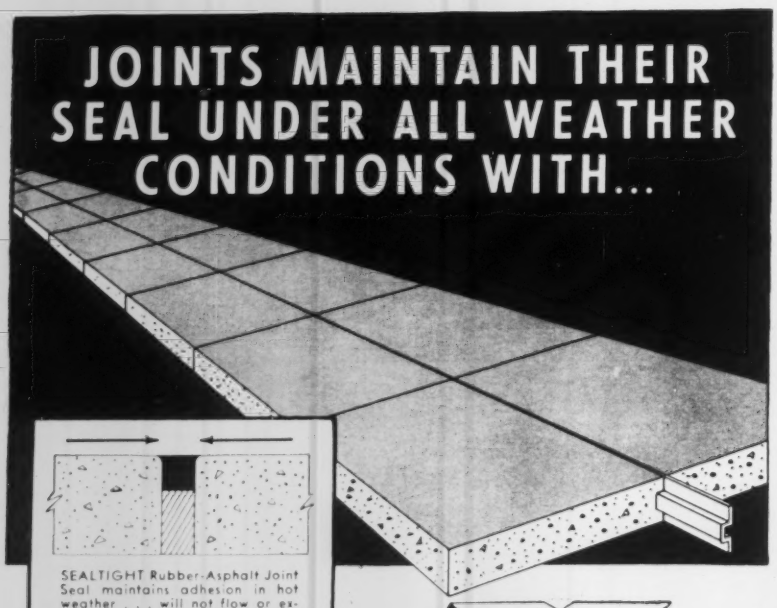

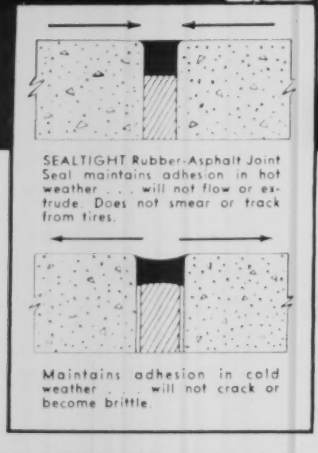

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4 story, bsmt.; U-shaped provincial bldg., Charlotte St. $1,000,000. Plans deposit $150. Mott & Myles, 13 Germain St., Saint John, archts. and engrs. CD 4-22-59.

▲ Ont., Burlington—HOSPITAL—BA 5-5—Bd. Governors, Joseph Brant Memorial Hospital, Burlington, 5-story, 180-bed hospital, Brant Museum site, $1,500,000. Plans deposit $100. Prack & Prack, 310 Main St. E., Hamilton, archts.

BUILDINGS—SLC

▲ Que., Crabtree Mills—PLANT SUPERSTRUCTURE—Westminster Paper Co. Ltd., Crabtree Mills, soon lets contract superstructure for plant exten., over $1,000,000. Charles T. Main, Inc., 80 Federal St., Boston, Mass., U. S. A., engr. CD 2-5.

HEAVY CONSTRUCTION—LB & CA

NORTHWEST TERRITORIES—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.:

McNamara Constr. Co. Ltd., 13120-125th Ave., Edmonton, Alta., CA $941,600, grading, culverts, traffic gravel Mile 31.25 to Mile 83, Fort Providence to Frank's Channel, (Contr. 1-59-NWT). CD 2-20, under LB.

BUILDINGS—LB & CA

Packard Constr. Co. Ltd., Suite 204-205, 88 Richmond St. W., Toronto, Ont., Owner Builds, $850,000. 7 story, 90-suite block, APARTMENT, west side of Jamison Ave., Nos. 106-112, TORONTO, ONT. Arved Soosaar, Suite 310, 86 Bloor St. W., Toronto, Ont., archt.

PUERTO RICO

HEAVY CONSTRUCTION—BA

▲† Puerto Rico—BUILDINGS AND UTILITIES—BA Or About 6-4—U. S. Eng., P.O. Box 4829, San Juan, buildings and utilities for Adan Facilities, Camp Losey and Camp Salinas; ENG-08-123-59-61. CD 11-6, under Puerto Rico, Camp Losey and Puerto Rico, Camp Salinas.

PROPOSED PROJECTS

WATER SUPPLY

Ind., Huntington—Bd. P. Wks. & Safety, water sys. imprvs., $950,000, Henry B. Steeg & Assocs., Inc., 3338 N. Illinois St., Indianapolis, consult. engr.

▲ Iowa, Fort Dodge—City, City Hall, WW imprvs., $2,200,000. Buell & Winter, 310 Insurance Exchange, Sioux City, and Howard R. Green Co., 417 1st Ave. SE., Cedar Rapids, consult. engrs.

▲ Tex., Haltom City—Haltom City Water Auth., WW facilities, $3,000,000. Joe J. Rady, 511 Insurance Bldg., Fort Worth, consult. engr. CD 2-26-59.

SEWERS, WASTE DISPOSAL

▲ Conn., Milford—Town, Town Hall, West Side Sewage Disposal Plant, Riverside, Devon, $1,000,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., consult. engrs.

▲ N. Y., North Tonawanda—City, City Hall, storm sewer line, northern area, $1,000,000. Wilson Hardieben, c/o owner, city engr.

▲ O., Dayton—City, City Hall,
storm sewers Albany-Hopeland (Edgemont), $450,000,
storm sewers in Dennison-Weaver Ave., $90,000,
storm sewers in East Dayton, $1,500,000,
Gettysburg trunk storm sewer (one third of Westwood), $660,000,
storm sewers in Greenwich Village area (addnl. work), $115,000,
storm sewers in Irwin St., $500,000,
storm sewers in Russett Ave. (East Hearthstone), $200,000,
storm sewers in Tennyson Ave. (College Hill), $520,000. Funds voted Mar. 24.

▲ O., Fairfield—City, City Hall, storm and sanitary sewage sys. and sewage disposal plant, $6,000,000. Consoer Townsend Assocs., 360 E. Grand Ave., Chicago 11, Ill., consult. engrs.

▲ Tex., Victoria—City, City Hall, storm drainage (Tex. 41-P-3061), $1,750,000. CD 4-7-52.

BRIDGES

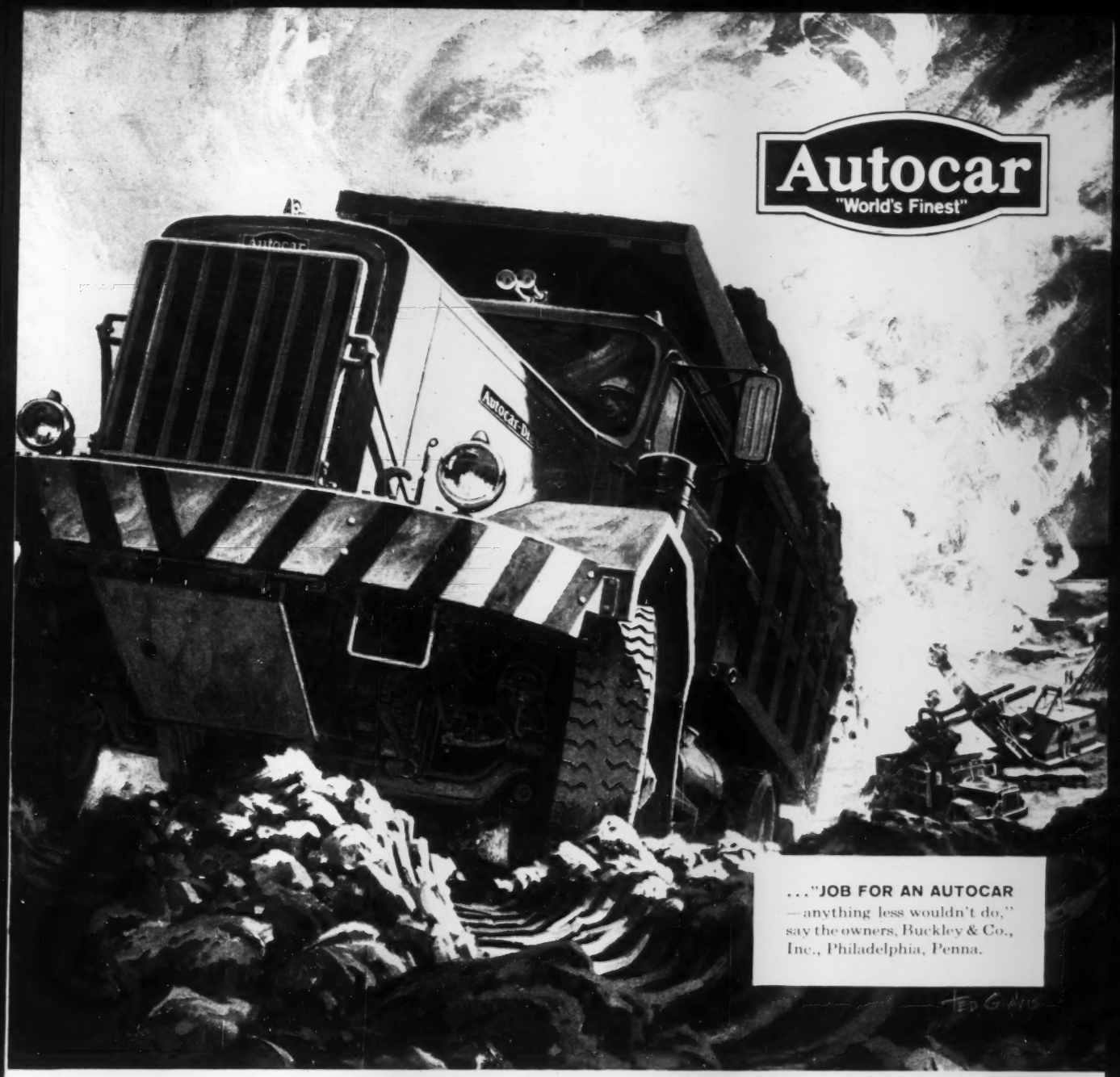
▲ MAINE and CANADA—State of Maine, Government of Canada and Province of New Brunswick:
bridge to link U. S. port of Lubec, Maine, with Campobello in Bay of Fundy, New Brunswick, $1,050,000.

▲ NEW YORK—Dpt. P. Wks., State Office Bldg., Albany,
Bronx Co.—Alexander Hamilton Bridge approach at High Bridge Park, Cross Bronx Expressway, $3,500,000,
substructure of Alexander Hamilton Bridge-Cross Harlem River-Cross Bronx Expressway, $2,600,000,
superstructure Alexander Hamilton Bridge-Cross Bronx Expressway, $4,784,000. Andrews & Clark, 405 Lexington Ave., New York 17, N. Y., and Hardesty & Hanover, 101 Park Ave., New York 17, N. Y., consult. engrs. To go ahead 1960.

▲ O., Dayton—City, City Hall, railroad grade separation at Montgomery-Keowee Ave., $1,200,000. Funds voted Mar. 24.

▲ PENNSYLVANIA—Pa. Hys. Dpt., 506 North Office Bldg., Harrisburg,
Butler Co.—divided 4 lane viaduct to carry Pickle Gate Rd. over Connoquenessing Creek, railroad tracks and State Rte. 8, Bradenville and Lyndora, $1,743,000. W. R. Froehlich, c/o owner, act. ch. engr.

(Continued on page 78)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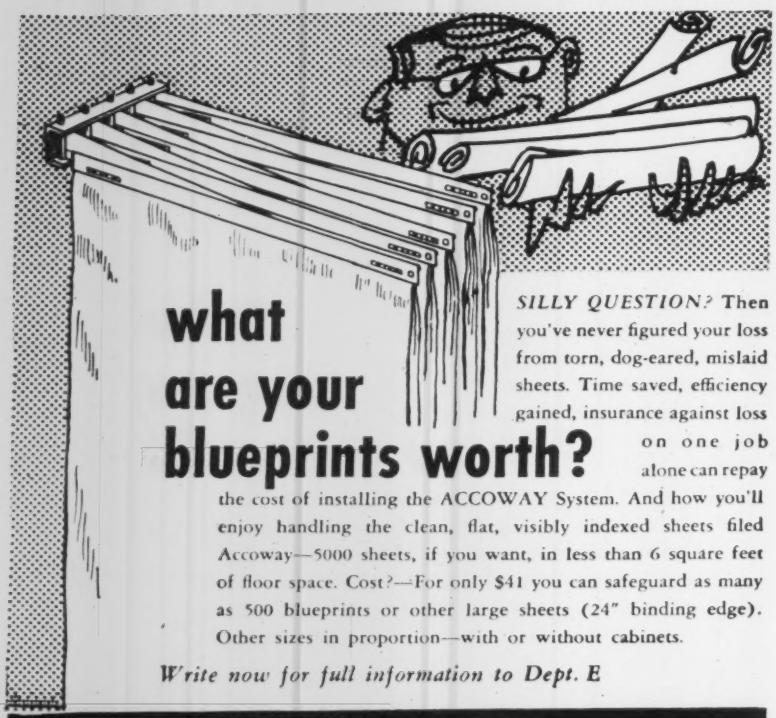

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(Continued from page 76)

STREETS AND ROADS

▲ CALIFORNIA—State Div. Hys., 1120 N. St., Sacramento.
Orange Co.—paving to widen 6.5 mi. Whittier Blvd. and Fullerton Rd. (State Hy. Rte. 2) to conventional 4 lane divided hy. between Valley Home Ave. at Los Angeles Co. line in LaHabra and Brea Blvd. in Fullerton, $1,700,000. Bids late spring or summer.
Santa Barbara Co.—paving to reconstr. southbound expressway lanes for 11.5 mi. U. S. Hy. 101 between 1 mi. north of Los Alamos and 4 mi. south of Santa Mara, $425,000.
surf. to constr. addnl. 2 lanes Orcutt Rd. (State Hy. Rte. 2) between Orcutt and 1.5 mi. south of Santa Mara, $750,000.
Tulare Co.—relocating portion State Sign. Rte. 198 around Terminus Dam reservoir and spillway area, $4,300,000.
Ventura Co.—paving to widen 8.7 mi. US Hy. 101 from 3 lanes to 4 lanes between Ventura River N.W. of Ventura and ½ mi. north of Seacliff, $450,000. Bids soon.
▲ NEW YORK—Dpt. P. Wks., State Office Bldg., Albany.
Bronx Co.—superstructure, grading, paving Cross Bronx Expressway; Deegan Expressway Interchange, $3,958,000.
substructure and walls Underhill Ave. to Deegan Expressway-Cross Bronx Expressway; Deegan Expressway Interchange, $5,677,000.
0.5 mi. from Walton to Plimpton Aves., Cross Bronx Expressway, $9,700,000.
0.2 mi. from Plimpton to University Aves., Cross Bronx Expressway Interchange with Deegan Expressway, $6,200,000, Hardesty & Hanover, 101 Park Ave., New York 17, N. Y., and Andrews & Clark, 305 E. 63d St., New York 21, N. Y., consult. engrs. on foregoing projects. To go ahead 1959. CD 2-11-55.
Kings Co.—0.9 mi. Gowanus Expressway from Clinton St. to 20th St., $12,000,000.
0.8 mi. Gowanus Expressway from 20th St. to 36th St., $9,900,000.
0.9 mi. Gowanus Expressway from 36th St. to 55th St., $12,800,000.
0.5 mi. Gowanus Expressway from 55th St. to 4th Ave., $11,600,000.
1.7 mi. Gowanus Expressway from 4th Ave. to 92nd St., $14,000,000.
0.3 mi. Gowanus Expressway from Brooklyn-Queens Expressway to Clinton St., $3,200,000, Madigan-Hyland, 28-04 41 Ave., Long Island City, N. Y., engrs. on foregoing projects. To go ahead in 1961.
Queens and Bronx Counties—2.7 mi. Throggs Neck Expressway approaches plus structures at both ends of new bridge, $7,650,000.
landscaping and signs Throggs Neck Expressway, $600,000, Lockwood, Kessler & Bartlett, Syosset, N. Y., engrs. on foregoing projects. To go ahead 1960.
Richmond Co.—Contr. 1, 2.4 mi. Clove Lakes Expressway from Goethals Bridge to Victory Blvd., $9,500,000.
Contr. 2, 1.8 mi. Clove Lakes Expressway from Victory Blvd. to Slosson Ave., $6,400,000.
Contr. 3, 1.4 mi. Clove Lakes Expressway from Slosson Ave. to Richmond Rd., $5,700,000.
Contr. 4, 1.2 mi. Clove Lakes Expressway from Richmond Rd. to Narrows Bridge Plaza, $6,400,000. Andrews & Clark, 305 E. 63d St., New York 21, N. Y., engrs. on foregoing projects. To go ahead 1960.
▲ OHIO—State Hy. Dpt., State Dpt. Bldg., Columbus.
Adams Co.—shifting Rte. 52, 3 mi. east of Brown Co. Line and regains the route 1½ mi. east of Elk Run, $2,000,000.
Athens Co.—relocation Rtes. 7 and 50 join at Coolville and running northeast to Rte. 555 in Jefferson Co., $8,000,000.
▲ OHIO—Hy. Dpt., State Dpts. Bldg., Columbus.
Columbiana Co.—by-pass north Salem for Rte. 62 and alternate Rte. 14, $11,000,000-$12,000,000. Tentative agreement on route has been reached by state and consulting engineers, Gaodkin & O'Dell, Newark, O., consult. engrs. 1962-1963 scheduling.
▲ O.—Dayton—City, City Hall.
Fifth St. improv., $320,000.
Gettysburg Ave. improv., $1,085,000.
extending Gettysburg Ave. from Germantown to Nicholas Ave., $160,000.
McArthur Ave. improv., $125,000.
Montgomery St. improv., $465,000.
improv. Riverside Dr., $1,100,000.
Smith St. improv., $286,000.
Smithfield Rd. improv., $470,000.
Wayne Ave. improv., W. 5th St. to Fifth St., $250,000.
Weaver St. improv., $106,000. Funds voted Mar. 24, CD 4-11-11.
▲ Wyo.—Casper—City, City-County Bldg., reshaping 28 mi. pavement, reconstr. 19 mi. pavement, 17.6 mi. new pavement, 55 mi. curb and gutters, storm sewers, etc., $9,207,000. A. J. Ryan & Assoc., Inc., 1448 Glenarm Place, Denver, Colo., consult. engrs. CD 4-20-59.

EARTHWORK, WATERWAYS

▲ Tex.—Orange—Orange County Conservation & Reclamation Dist., Courthouse. Phase 1, 267.2 mi. ditches and canals to serve as drainage structures, flood relief, $737,946. Phase 2, 94.27 mi. ditches and canals part of flood relief, $1,983,767. Charles P. Smith & Assocs., Orange, consult. engrs.

AIRPORTS

▲ Colo.—Golden—AIR FIELD—Industries for Jefferson Co., Inc., 7,000 ft. airfield, Northwest-Southeast runway, $1,000,000. Ken R. White, 1567 Marion, Denver, consult. engr. Continental Engineers, Inc., 9625 W. Colfax, Denver, survey engr. CD 1-6-

(Continued on page 80)

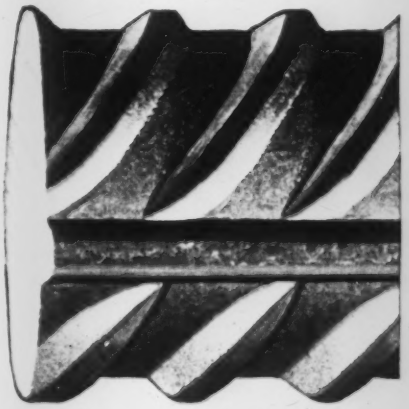
Sheffield No. 18 and No. 14 Crescent Reinforcing Bar, spaced on 12-in. centers, in the Tuttle Creek Dam spillway.

Sheffield "backbone of steel" helps control a Kansas river

The Tuttle Creek Dam, U. S. Corps of Engineers' flood storage reservoir on the Blue River near Manhattan, Kansas, is big any way you look at it. Big in gross reservoir capacity — 2,280,000 acre-feet, draining 9,566 square miles in Kansas and Nebraska. Big in cost, topping $90 million. And big in the benefits it will bring as part of the vast Missouri Valley flood control program.

Sheffield Crescent Reinforcing Bars are being used in the dam (now 57% completed). Some of the reasons why: Sheffield's rigidly controlled quality; strategic location of mills; big productive capacity, and facilities for producing such large items as the No. 18 reinforcing bar.

You can depend on Sheffield for top-quality steel and conscientious service.



No. 18 SHEFFIELD BAR used in the Tuttle Creek Dam. This is an exact-size section.

SHEFFIELD
ARMCO
Crescent
Reinforcing Bars

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

(Continued from page 78)

▲ Ky., Covington—AIRPORT—Kenton Co. Airport Bd., Court St., runways at Greater Cincinnati Airport, $1,500,000. Hall, McAllister, Stockwell, 606 Walnut St., Cincinnati, O., consult. engrs. Bids in June.

PUERTO RICO

▲† Puerto Rico, Camp Losey (Fort Allen)—HOUSING—U. S. Eng., 675 Riverside Ave., Jacksonville, Fla., 150 unit Capehart Housing, Camp Losey, at Caribbean Signal Agency, $2,475,000.

PUBLIC BUILDINGS

▲ Alaska, College—GYMNASIUM—University of Alaska, College, plans by Manley & Mayer, Anchorage, gymnasium, $1,600,000. Constr. in 1959.

▲† Ariz., Fort Huachuca—HOUSING—U. S. Eng., 751 S. Figueroa St., Los Angeles 17, Calif., 200 unit Capehart Housing, Fort Huachuca No. 2, $4,400,000. CD 9-5.

▲ Calif., Anaheim—SCHOOLS—Anaheim Union High School Dist., Anaheim, voted $5,000,000 bonds Mar. 24, schools.

▲ Calif., Anaheim—SCHOOLS—Anaheim City School Dist., voted $3,000,000 bonds Mar. 24, school improvs. CD 1-28.

▲† Calif., Fort Ord—CAPEHART HOUSING—U. S. Eng., 180 New Montgomery St., San Francisco, 500 unit Capehart Housing No. 1, $8,250,000.

▲ Calif., Los Angeles—INSTRUCTIONAL SERVICES—Bd. Educ., 1335 S. San Pedro, plans by A. C. Zimmerman, 2439 Hyperion Ave., instructional services bldg., 451 N. Grand Ave., $1,000,000. CD 6-9.

▲ Calif., Redwood City—SCHOOL—Sequoia Union High School Dist., 480 James St., plans by Dean W. Johnson, 166 Geary St., San Francisco, San Carlos High School, $3,448,009. CD 3-26-58.

Calif., San Bernardino—HOUSING—San Bernardino County Housing Auth., San Bernardino, plans by Clarence Day, Investment Bldg., Redlands, and Jay Deavey Harnish, 222 E. "B" St., Ontario, 1 story, frame stucco, 65 unit public housing, Redlands, $850,000.

▲ Calif., Ventura—SCHOOL—Ventura Union High School Dist., Ventura, plans by Wilson, Stron & Wilson, 1401 Sea Rd., Santa Paula, frame, stucco, Senior High School No. 2, $3,000,000. Bids soon. CD 4-16-56.

▲ D. C., Wash.—HOME for AGED—D. C. Govt., Buildings & Grounds, 499 Pa. Ave., N.W., plans by McLeod & Ferrar, 1200 18 St., N.W., Home for Aged at Blue Plains, Over $2,000,000 (no appropriation).

▲† D. C., Wash.—MEDICAL SCHOOL—U. S. Eng., 1st and Douglas Sts., N.W., plans by Ronald Senseman, 2705 Georgia Ave., Army Medical School addn.; Army Medical Center, Walter Reed Hospital, $1,000,000-$5,000,000 (no appropriation). CD 9-18-57.

▲ Ill., Chester—HOSPITAL—Randolph Co. Hospital Dist., Chester, referendum election May 16, county hospital, $1,000,000. Hanner-Bartels & Assocs., 21 E. Aston St., Wood River, Ill., and Chester, Ill., archts. CD 1-6.

▲ Ind., Gary—SCHOOL—School City of Gary, 10 Place and Virginia St., plans by Frederick W. Collins, 400 W. 5 Ave., 2 story, brick Morton Park Elementary School and gymnasium, 14th and Harrison Sts., $1,300,000.

▲† Kan., Fort Riley—HOUSING—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., No. 2, 867 unit Capehart Housing, $14,305,500.

▲† Ky., Fort Knox—HOUSING—U. S. Eng., 830 W. Broadway, Louisville, Zone 1, 350 unit Capehart Housing, Fort Knox No. 2, $5,775,000.

▲ Me., Bangor—SCHOOL—City Supt. Schools, 183 Harlow St., Senior High School, $1,000,000. Construction 1959.

▲† Mass., Ayer—HOUSING—U. S. Eng., 424 Trapelo Rd., Waltham, Zone 51, 1,200 unit Capehart Housing, Fort Devens, $19,800,000.

▲ Mass., Rehoboth—SCHOOL—Rehoboth & Dighton Regional Dist. Supt. Schools, plans by Howe, Prout & Ekman, 17 Custom House St., Providence, R. I., Regional High School, Rehoboth-Dighton Town Line, $1,800,000. CD 10-7.

▲ Mich., Detroit—SCHOOLS—City, City Hall, voted $60,000,000 bonds Apr. 6, schools. Total to be raised is $90,000,000 to be issued over 25-year period). CD 3-6.

▲ Minn., Duluth—SCHOOL—Bd. Educ., St. Louis Co. Court House, plans by Jyring & Whiteman, 1932 East 5th Ave., Hibbing, Brookston-Alborn Area High School at intersection of Hys. 2 and 33, $1,500,000. (Change of archts.). CD 8-27-57.

▲† Mo., Fort Leonard Wood—HOUSING—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., 800 unit Capehart Housing, Fort Leonard Wood No. 3, $13,200,000.

Neb., Fort Crook—SCHOOL—School Dist. 46, Fort Crook, plans by Henningson, Durham & Richardson, 2462 Harney St., Omaha, and Perkins & Will, 309 W. Jackson St., Chicago, 11, 1000 High School, 3½ mi. from Springfield, $890,000.

▲ N. J., Bernardsville—SCHOOL—Somerset Hills Regional High School Dist., proposed, rejected at referendum Mar. 31, high school addn., $2,000,000. Ernest Brown, 7 Watchung Ave., Plainfield, archt. CD 3-11.

▲ N. J., Bloomfield—SCHOOLS—Twp., Twp. Hall, plans by Raymond P. Ellett, 124½ Bloomfield Ave., Berkeley, Brookside, Center, Fairview, Watsessing and Franklin School addns., $1,050,000.

DICKERSON USES LESCHEN

Leschen Strand selected for one of the largest strand patterns tensioned in Pennsylvania

Dickerson Structural Concrete Corporation, Youngwood, Pennsylvania, is producing prestressed concrete box beams for highway bridges in Western Pennsylvania. The Allegheny County bridge shown utilizes beams 88'8" long by 4' wide by 3½' deep which weigh 37 tons each. Design plans called for seventy strands of ⅜" diameter in a pattern across the base and partially up the sides.

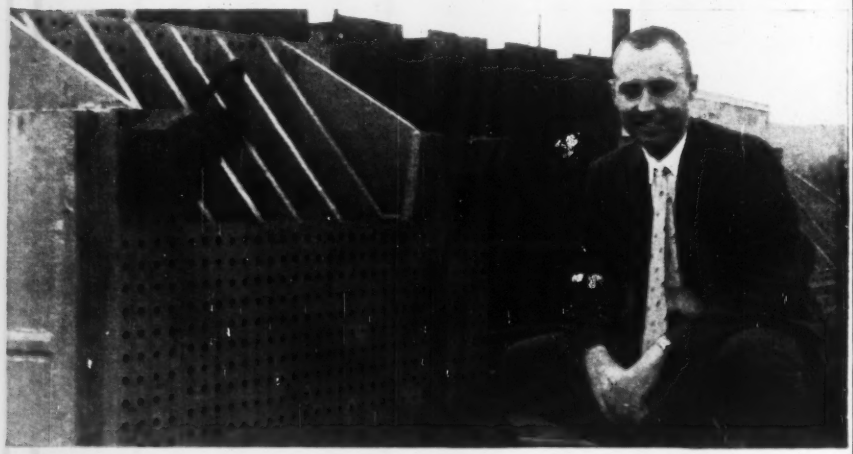
Dickerson is one of an increasing group of *Leschen Prestress Strand* customers who value the sound advice and practicality of Leschen engineers.

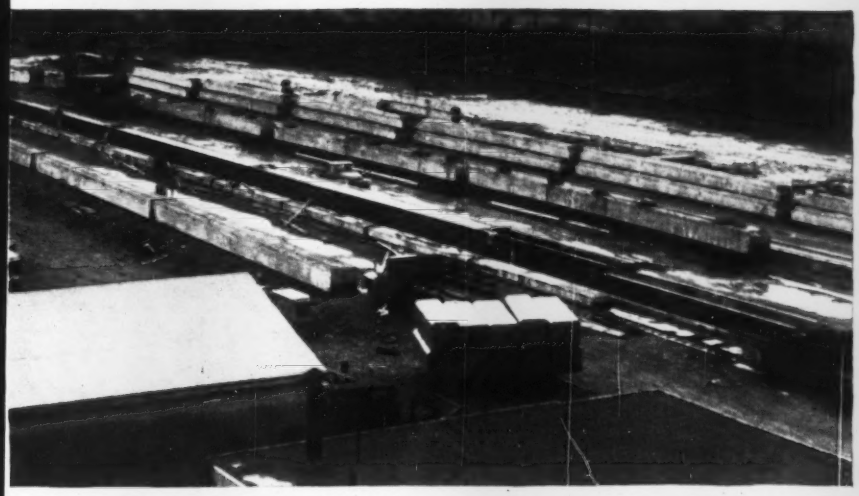
The technical requirements of prestressing, too, require unvarying strand quality—where every foot matches every other foot. At Leschen, this high standard is made possible by a new continuous-flow technique in today's most thoroughly modern wire mill. Here new processes, new machines, new methods maintain standards and quality that are above the industry's specifications.

If you would like to talk with a Leschen Strand engineer or receive complete specifications and other helpful information, write today to *Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Mo.*

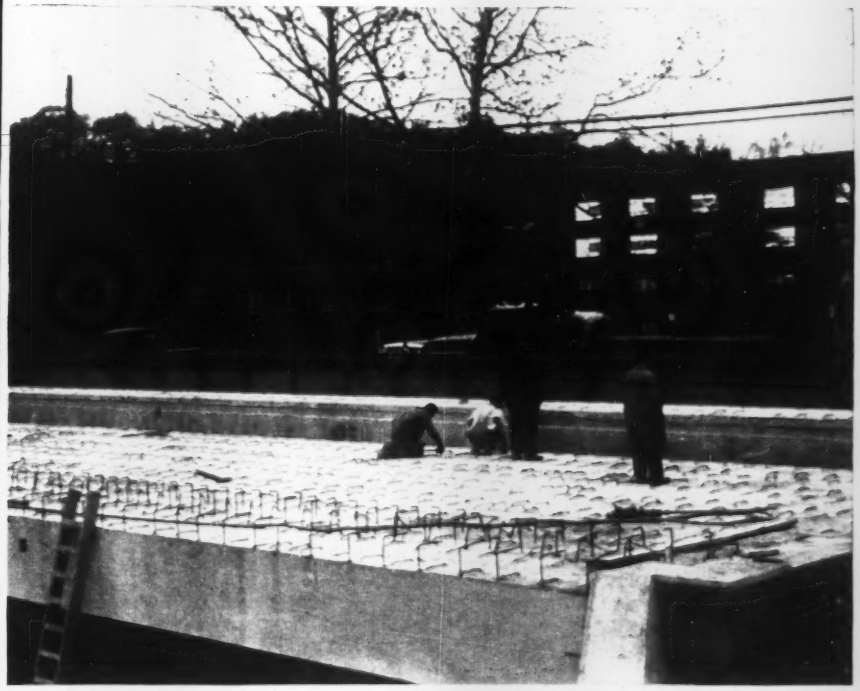
LESCHEN
PRESTRESS STRAND

Mr. Earle A. Butts, Jr., Dickerson Manager, looks over the strand template used in tensioning the Allegheny County strand patterns. He reports that Leschen Prestress Strand has performed as a well engineered and high quality product.





Leschen strand has helped the Dickerson plant to meet varying design requirements with box beams. The Allegheny County bridge beams were cast four at a time on a 440-foot bed, requiring over 30,000 feet of Leschen $\frac{3}{8}$" Strand per pour. Tension: 14,000 pounds per strand or a total force of 980,000 pounds which is converted to a compressive force in the beam.



Positioning these same 37 ton beams on location at highway bridge over Peters Creek on T.R. 51 in Allegheny County near Pittsburgh. These beams with a minimum of construction depth, replaced an existing steel bridge.

LESCHEN WIRE ROPE DIVISION

H.K. PORTER COMPANY, INC.

DIVISIONS: Connors Steel, Delta-Star Electric, Disston, Forge and Fittings, Leschen Wire Rope, Mouldings, National Electric, Refractories, Riverside-Alloy Metal, Thermoid, Vulcan-Kidd Steel, H. K. Porter Company (Canada) Ltd.

▲† N. J., Fort Dix—HOUSING—U. S. Eng., 2635 Abbottsford Rd., Phila., Pa., 200 unit Capehart Housing, Fort Dix No. 2, $3,300,000. CD 9-5.

▲ N. J., Franklin Twp. (Middlebush P.O.)—SCHOOL—Bd. Educ., Twp. of Franklin, Middlebush, plans by Micklewright & Mountford, E. Stuyvesant Ave., Trenton, high school, $1,000,000.

▲ N. J., Newark—HOUSING—Housing Auth. of City of Newark, 57 Sussex St., plans by William Lehman Assocs., 972 Broad St., 1,680 unit Public Housing No. NJ 219, West Kinney, Howard, Broome, Mercer and Lincoln Sts., $23,330,000.

N. Y., Jamestown—SCHOOL—Bd. Educ., bond election May 5, Elementary and Junior High School addns., renovation, $985,000.

N. Y., Niagara Falls—SCHOOL—Bd. Educ., Admin. Bldg., bond election May 5, elementary school addn., alterations, $853,304. Shakelton & Fitzgerald, 1513 Lockport, archts. CD 1-30.

▲ N. Y., Peekskill—HOUSING—City Housing Auth., plans by Frederic P. Wiedersum Assoc., 65 Roosevelt Ave., Valley Stream, N. Y., 130-unit Bohlmann Towers Housing, with 8 store, gymnasium, Main and Linden Sts., $2,379,000. Bids in June.

▲ N. Y., Spencerport—SCHOOLS—Spencerport Central School Dist., bond election May 7, high school, $2,180,000; swimming pool, $249,000. Wasdrop, Northrup & Austin, 740 East Ave., Rochester, archts.

N. Y., Syracuse—SCHOOL—Bd. Educ., 409 W. Genesee St., plans by Sargent, Webster, Cranshaw & Foley, Erie Blvd. East, for site planning. F. Ware Clary Junior High School, $900,000.

▲ N. Y., Syracuse—SCHOOLS—Bd. Educ., 4019 W. Genesee St.,
Junior High School, Syracuse East Side, $2,400,000. Constr. 1959.
McKinley High School Addn., $1,000,000.
high school, North Side, $4,700,000.
high school, southwest part of city, $4,700,000.
Junior High School, west side of city, $1,500,000.
Croton Elementary School addn., $1,200,000.
Perry Hughes School addn., $500,000.

▲ O., Berea—SCHOOL—Bd. Educ., 390 Fair St., voted bonds Mar. 31, Junior High School, $2,350,000. Mellenbrook, Foley & Scott, 20 Beech St., archts. CD 1-21.

O., Hillsboro—SCHOOL—Bd. Educ. defeated bonds Apr. 4, school, $869,000. CD 1-6.

O., Hubbard—SCHOOL—Bd. Educ. plans by Smith, Friedman & Smith, Schween-Wagner Bldg., Youngstown, Maude E. Reed Grade School, Hall Ave., $850,000. Bids in May. CD 3-26.

▲ O., Maumee—SCHOOL—Bd. Educ., Maumee Senior High School, on Anthony Wayne Trail, $1,200,000.

▲ Pa., Eagleville—SCHOOL—Lower Providence-Worcester Jt. School Dists., Eagleville, plans by Barney, Banwell, Armentrout & Divens, 2408 Girard Trust Bldg., Phila., Junior-Senior High School, $2,000,000.

▲ Tenn., Shelbyville—HOUSING—City, Shelbyville, two public housing projs., $1,900,000.

▲ Tex., El Paso—CLASSROOMS—State University of Texas, Admin. Bldg., Austin, plans by Jessen, Jessen, Millhouse & Greeven, 2816 Hemphill Park, Austin, 4 or 5 story 100,000 sq. ft. masonry classrooms for Texas Western College, $1,500,000. CD 6-23.

▲† Tex., El Paso—CAPEHART HOUSING—U. S. Eng., 2132 Central Ave. S. E., Albuquerque, N. M., 1,000 unit Capehart Housing, Fort Bliss, No. 3, $16,500,000.

▲† Tex., Fort Hood—CAPEHART HOUSING—U. S. Eng., P. O. Box 1600, Fort Worth, 800 unit Capehart Housing No. 2, $13,200,000.

▲ Tex., Fort Stockton—SCHOOL—Fort Stockton Ind. School Dist., plans by F. Dellnor Gross, 1900 Kermit Hy., Odessa, high school, $1,000,000; converting high school into Junior High School, $500,000.

▲ W. Va., Charleston—SCHOOL—Bd. Educ., Kanawha Co., voted $18,000,000 bonds Mar. 30, schools, Perkins & Will, 309 W. Jackson St., Chicago, Ill., consult. archts. CD 2-23.

▲ N. B., Fredericton—ADMINISTRATION, etc.—University of New Brunswick, Fredericton, plans by Larson & Larson, Reynolds Station, Winston-Salem, N. C., U. S. A., administration bldg., $650,000; physics and biology bldg., $1,250,000, both University Campus.

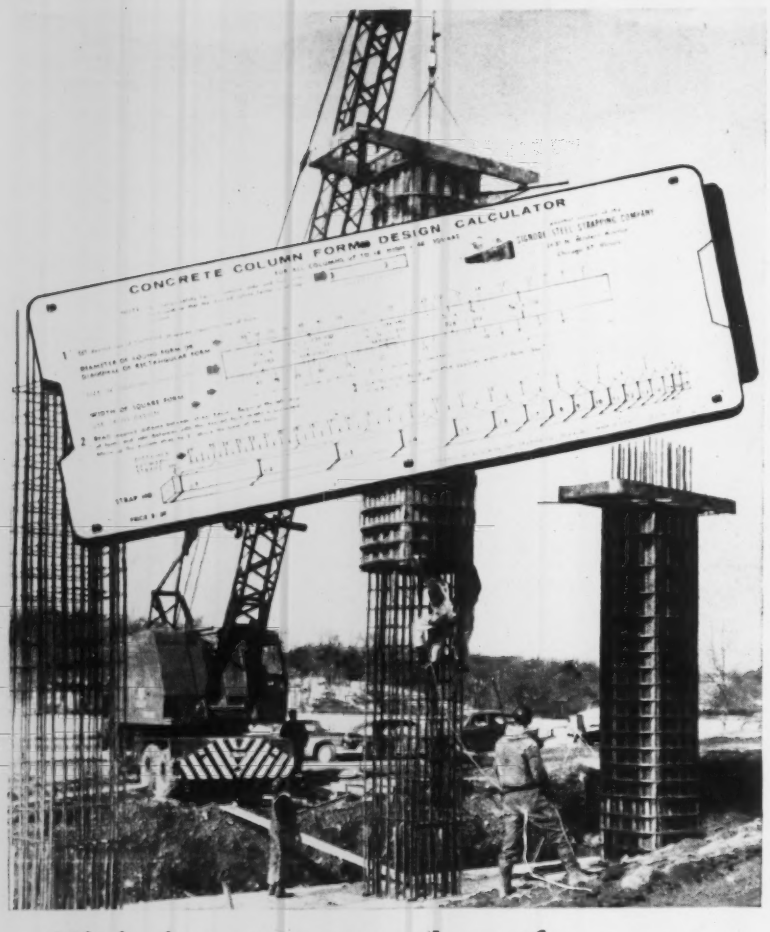
COMMERCIAL BUILDINGS

▲ Conn., Alnston—HOUSES—Alnston Lake Co., 264 houses, North Pond Rd., $1,640,000.

▲ Conn., East Hartford—APARTMENT—Sunset Hills, 1007 Flemington Ave., West Hartford, plans by Kane & Fairchild, 733 Asylum Ave., Hartford, 20 apartments, Airfield Dr., $2,000,000. CD 1-25.

▲ Conn., Fairfield—SHOPPING CENTER—King's Highway Realty Corp., 18 Pontiac Rd., West Hartford, plans by Allan H. Pokras, 2839 Main St., Bridgeport, shopping center, Tunxis Hill Rd., 80,000 sq. ft. department store, 24,000 sq. ft. supermarket, 65,000 sq. ft. other stores, $1,000,000, Igor Vechesloff, 35 Crescent St., West Hartford, consult. engr.

Conn., Groton—HOUSES—South Windsor Constr. Co., Inc., South Windsor, 87 houses, Section A, Fishtown Rd., $870,000.



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▲ Conn., Groton—HOUSES—South Windsor Constr. Co., Inc., South Windsor, 155 houses, Section B, Fishtown Rd., $1,550,000.

▲ Conn., Newington—BOWLING ALLEY—Val Previdini, 2143 Berlin Turnpike, "Bowl-O-Rama" addn., Berlin Turnpike, $1,000,000.

▲ D. C., Wash. — APARTMENTS — Webb & Knapp National Corp., 1012 14th St. N. W., plans by I. M. Pei & Assoc., 385 Madison Ave., New York, N. Y., two 8 story 256 units concrete masonry apartments, 1001 and 1101 3rd St. S. W., $2,500,000. CD 1/14/57.

▲ Hawaii, Honolulu—RESORT—Henry J. Kaiser, Fritz B. Burns, Welton Becket and Trustees of Bernice P. Bishop Estate, 1924 Broadway, Oakland, Calif., plans by Welton Becket & Assocs., 5657 Wilshire Blvd., Los Angeles 36, Calif., Hawaiian Resort and residential community, Koko Head and Maunalua lands, $350,000,000.

▲ Ill., East Alton—SHOPPING CENTER—Donald H. Shaneldling Assocs., 6505 Wilshire Blvd., Los Angeles, Calif., plans by Jacobson, Coppedge & Hukey, 4619 Beverly St., Los Angeles, Calif., and P. John Hoener & Assocs., 4227 Watson Rd., St. Louis 9, Mo., 200,000 sq. ft. shopping center, $6,000,000. Bids for first phase in Fall. CD 10/23.

▲ Ill., Palos Heights—SHOPPING CENTER—Scope Assocs., 117 Kedzie Ave., Evanston, Palos Gardens Plaza Shopping Center, 127 and S. Ridgeland Ave., $7,500,000.

▲ Ind., Indianapolis—MAIL ORDER HEADQUARTERS—Lane Bryant, Inc., 752 E. Market St., mail order headquarters, 24-acre site on Southwestern Ave., west of Keystone, $1,500,000. Rezoning required.

▲ Mass., Cambridge—SCIENCE—Massachusetts Institute of Technology, 77 Massachusetts Ave., earth science bldg. (geophysics, meteorology, oceanography, etc.), $2,527,500.

▲ Minn., Brooklyn Center—SHOPPING CENTER—Dayton's, 7th St. and Nicollet Ave., Minneapolis, plans by V. Gruen & Assocs., 7th St. and Nicollet Ave., Minneapolis, Brookdale Shopping Center, Hy. 100, Shingle Creek, 59th Ave. No. and Osseo Rd., $10,000,000. Constr. 1960-1961. CD 7/6/55.

▲ Mo., Kansas City — HOSPITAL — Lakeside Hospital, 2801 Flora, Kansas City, Mo., plans by Everitt & Feiertag, 4550 Main, Kansas City, Mo., 3 story, basmt., 120 x 200 ft. built-up roof, air-conditioned brick, reinforced-con. frame T-shaped Lakeside Hospital, $1,250,000.

▲ N. J., New Brunswick—APARTMENT—Morton Saltzman, 251 Chestnut Ave., Metuchen, 8 story apartment, Landing Lane, $1,000,000.

▲ N. Y., Brighton—APARTMENTS—Delmar Apartments, Inc., Elmwood and Clinton Aves., Brighton, 150 units apartments, northwest corner of Elmwood and Clinton Aves., $2,500,000.

▲ N. Y., Brighton—APARTMENT HOUSES—Irving S. Gordon, 90 Maywood Dr., Brighton, apartment houses, northeast corner of Elmwood and Clinton Aves., $8,000,000.

▲ N. Y., Brighton — APARTMENTS — Landing Heights Apartments, Brownwood Blvd., 322 units apartments, Brownwood Blvd., $4,500,000.

▲ N. Y., Greenburgh — COLLEGE BUILDINGS — Westchester Community College, 155 Battle Ave., White Plains, plans by Robert A. Green, Tower Hill, Tarrytown, college bldgs., $5,800,000.

▲ O., Akron — HOMES — Twin Oaks Estates Development Co., 68 S. Howard, 45 homes, West Hill, $1,500,000. Constr. June 1959.

▲ O., Columbus—APARTMENTS—Vernon C. Neal, Inc., 585 E. Town St., (Phase 1 of two-phase apartment project), University Arms apartment, Olentangy River Rd. and Ackerman Rd., $3,660,800.

▲ O., Columbus—APARTMENT—Vernon C. Neal, Inc., 585 E. Town St., (Second Phase), University Arms Apartments, off Olentangy River Rd. at Ackerman Rd., $4,000,000.

▲ O., Mansfield—HOSPITAL—St. Elizabeth Memorial Hospital, hospital, 635 Lexington Ave., $3,500,000.

▲ Ore., Portland—OFFICE—Standard Insurance Co., 812 S.W. Washington St., 20 story office, $7,000,000-$8,000,000.

▲ Pa., Butler—SHOPPING CENTER—Jacob & Celia Garber, Butler, plans by Rosenberg & Pennoni, Berger Bldg., Pittsburgh, shopping center, $2,500,000. William Greenough, Butler, and Frank Rossi, 101 Marlboro Dr., New Kensington, consult. engrs.

▲ Tenn., Knoxville—HOUSING—Dickson Realty & Insurance Co., 720 Broadway N.E., housing development, $1,400,000. Benjamin Crosland, Knoxville, engr.

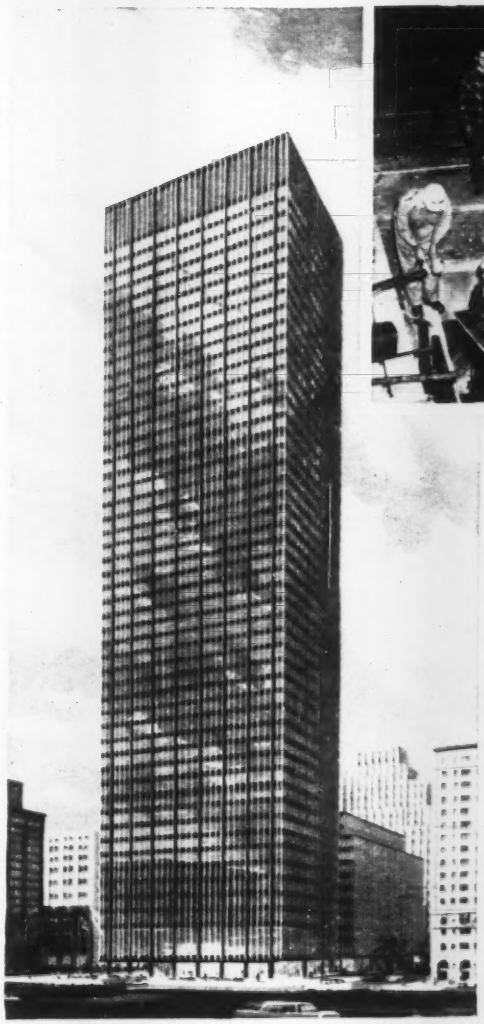
▲ Tex., Dallas—HOTEL—Dr. Daisy Spencer, 2000 Hans Graham & Assocs., 2000 K St. N.W., Wash., D. C., and Geo. L. Dahl, 2101 N. Pearl St., Dallas, archts., 200 room hotel, $5,000,000. (Correction—not) CD 4/13.

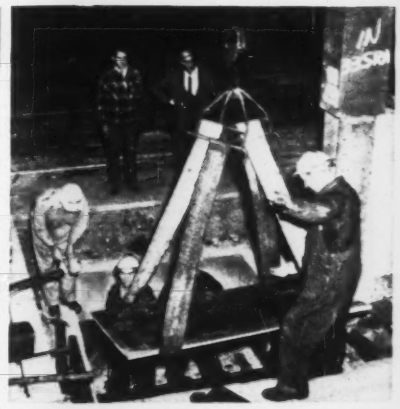
▲ Tex., Dallas—HOTEL—Ramada Hotels, 1529 E. Van Buren, Phoenix, Ariz., plans by Hedrick & Stanley, consult. engrs.-archts., 902 Fort Worth Ave., 8 story, 250 room hotel, $2,500,000. CD 3/20.

▲ Tex., El Paso—SHOPPING CENTER, etc.—J. B. Blaisingame, Am. Furniture Co., 1100 N. Oregon St., El Paso, shopping center, $1,750,000; area lighting and auto parking center paving for 2500 cars, $100,000; area lighting sys., $100,000; sanitary sewer lines, $95,000; water lines, facilities, $56,000, 25 acres off Dyer St.

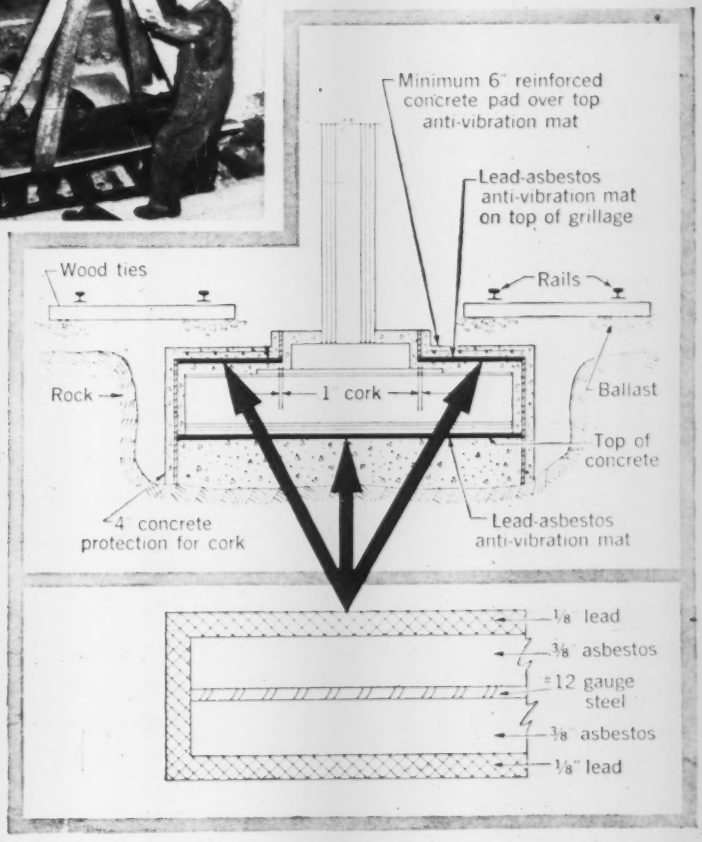
▲ Tex., El Paso—APARTMENT, etc.—Keith O'Leary & Assocs., 3300 Dyer St., 2 story (type B-N, 24) apartment units, concrete fdn., Texons Dr., $750,000.

(Continued on page 86)





Lead-asbestos anti-vibration pad is lowered into place beneath column of new Union Carbide building. Inset diagram shows cross section of foundation structure.



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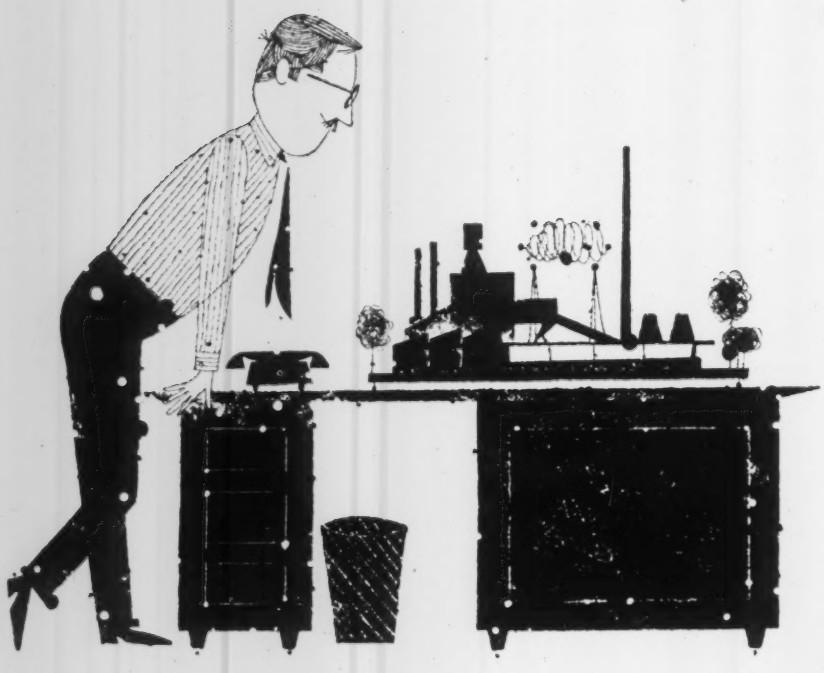

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A McGraw-Hill Magazine – Member Audit Bureau of Circulations – 330 West 42d St., New York 36, N. Y.

EXPRESS PAVER at work on Highway 11 in Racine County, Wisconsin. Highway Pavers, Inc. uses the machine on a variety of jobs, finds that the new screed heaters are fifteen to twenty minutes faster, lets crews get underway with less start-up time.

"All my crews prefer the Blaw-Knox Express Pavers"

"The operators find that it is easy to work with because of the rubber tires and fully automatic drive. Truck drivers prefer to dump into the big hopper, and the machine gives a steadier push on the truck. As a result, they can unload and pull out more quickly," reports James F. Peterson, superintendent with Highway Pavers, Inc., Milwaukee.

"With a ten man crew—a paver operator, a screed operator, 3 roller operators, and 5 laborers —we have paved many hours, laying material as fast as the paver would travel. There are fewer carry backs. Bleedouts are less troublesome. There's less shoveling at intersections—the men simply take off the sideplates and the Express Paver does most of the job," he adds.

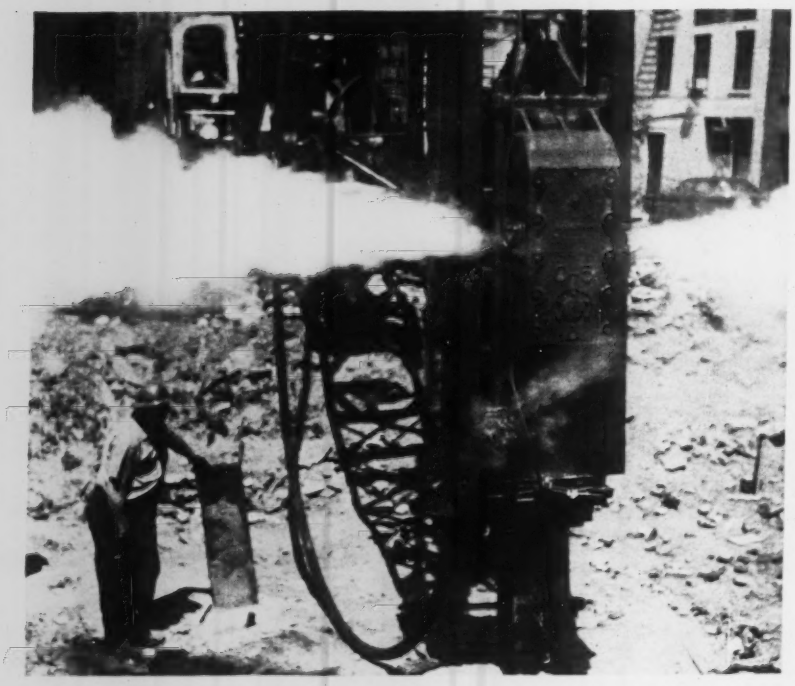
Performance like this has earned a preferred status for the Blaw-Knox Express Paver with contractors all over America. They want trouble-free, high-volume production that will meet the most rigid highway department specifications. They get it with the Express Paver. You can, too. Your Blaw-Knox Distributor is where you start.

BLAW-KNOX

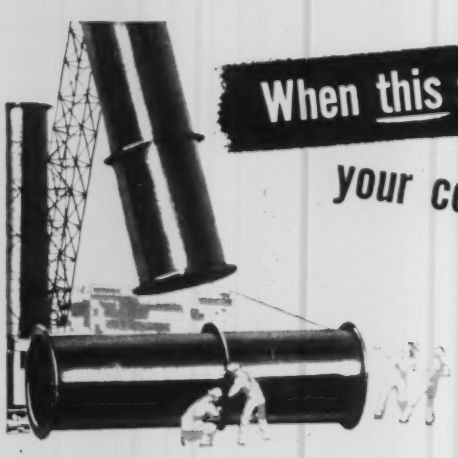
BLAW-KNOX COMPANY

Construction Equipment
300 Sixth Avenue
Pittsburgh 22, Pennsylvania

(Advertisement)



The new McKiernan-Terry C-5 Pile Hammer driving 60 ft. long, H-Beam, foundation piles for the Brooklyn-Queens Expressway, New York City. 580 cu. ft. of air powers this economical 5,000 lb. hammer to deliver 110, 16,000 ft. lb. blows a minute. Master engineered for utility, precision manufactured for durability—accept less and the ultimate cost will be more. McKiernan-Terry Corporation, Pile Hammer Division, 80 Richards Avenue, Dover, N. J.



When this stack goes up

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A. O. Smith *Permaglas*® smokestacks—glass-protected inside and out . . . are virtually impervious to condensate corrosion

Write for free bulletin SS-202 illustrating how to get greater return from your stack investment

A. O. Smith Corporation, Dept. ENR-49, Milwaukee 1, Wis. Please send me a copy of the Permaglas Smokestack Bulletin No. SS-202.

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A.O.Smith CORPORATION

PERMAGLAS SMOKESTACK SALES
PROCESS EQUIPMENT DIVISION
MILWAUKEE 1, WISCONSIN

(Continued from page 82)

160 two story face brick apartment units; concrete fdn., Railroad Dr., $950,000.

▲ Tex., Houston—APARTMENT, etc.—W. W. Crochet & Assocs., Developers, 2421 W. Holcombe Blvd., plans by W. W. Crochet & Co., 2421 W. Holcombe Blvd., 3 story apartment, swimming pool, $2,000,000. CD 9-23.

▲ Tex., Houston—OFFICE—Phil Rich & Son, 2920 Caroline St., office, 3333 Fannin St., $1,000,000. Southern Bell Telephone Co., lessee.

▲ Tex., Houston—APARTMENT—Tall Timbers Corp., Allister B. Mahon, 1720 N. Esperson Bldg., Houston and Harold Clark, 8200 Forest Lane, Dallas, plans by D. W. Rhodes, c/o 1720 N. Esperson Bldg., 149 unit apartment, River Oaks, $1,250,000.

▲ Tex., San Antonio—HOME FOR AGED—Methodist Church, Dist. Bd. for Homes for Older Adults, Leland S. Austin (Chm.) National Bank Commerce Bldg., plans by Marmon & Mok & Wm. D. Jones, 613 S. Texas Bldg., Methodist Home for Aged, Babcock Rd., $1,500,000., Methodist Home for Aged $1,100,000., Methodist Home for Aged $1,000,000., Methodist Home for Aged Babcock and St. Cloud Rds. $1,000,000. Reynolds & Morgan, Insurance Bldg. and Barry F. Johnson, 1102 Basse Rd., San Antonio, consult. engrs. CD 11-9-57.

▲ Utah, Salt Lake City—APARTMENT, etc.—A. P. Nelson Constr., 2360 S. Main St., and Ben H. Davis, 130 S. 4th E., plans by Slack W. Winburn, Security Life Bldg., 7 story apartment and hotel, 2 parking levels underground, incl. swimming pool, $2,000,000.

▲ Wash., Seattle—SHOPPING CENTER—Backus Improvement Co., 211 Madison St., Zone 4, plans by J. Graham & Co., 1426 5th Ave., 383,192 sq. ft. Aurora Village Shopping Center, N. 205 St. and Aurora Ave., on 35 acre site, $7,000,000. Constr. this year.

▲ Wash., Tacoma—SHOPPING CENTER—Tacoma Freeway Mart, Inc., c/o L. Romano, 2027 29 Ave. S., Seattle, to bldg. 400,000 sq. ft. shopping center, Tacoma Freeway and S. 43 St., $4,000,000, rezoning required before work can start.

INDUSTRIAL BUILDINGS

▲ Ga., Atlanta—PLANT—Crown Cork & Seal Co., Erie Ave. and H. Sts., Phila. 26, Pa., 250,000 sq. ft. metal container mfg. plant, Hy. 41 and Browns Mill Rd., $7,000,000., Robert & Co., 96 Poplar, N.W., archts.-engrs. CD 4-3.

▲ Md., Halethorpe—BREWERY—Carling Brewing Corp., 9400 Quincy Ave., Cleveland 6, O., brewery, $12,000,000. McGeorge-Hargett & Assocs., 7016 Euclid Ave., Cleveland, O., consult. engrs. Start work in fall. CD 5-27-57.

▲ Mich., Detroit—PLANT—Chrysler Corp., 341 Mass., Highland Park, converting stamping plant into glass fabricating plant, $6,000,000.

▲ Mich., Saginaw—FACTORY—McDonald Cooperative Dairy Co., 609 Lewis, Flint, 50,000 sq. ft. ice cream factory, Buena Vista Twp., $1,000,000.

▲ N. J., Paramus—INDUSTRIAL—Fidelity Engineering Co., Inc., 149 Hackensack Ave., Hackensack, 60,000 sq. ft. industrial bldg. (for lease), Winters Ave., $1,000,000.

▲ N. Y., Seneca Falls—KNITTING MILL—Seneca Knitting Mills, Inc., knitting mill, $1,250,000. Carl Bea, Pijlaski, consult. engr. CD 3-24.

O., Dayton—WAREHOUSE—General Motors Corp., Inland Mfg. Div., 2727 Inland, 1 story, 100,000 sq. ft. brick, steel warehouse, Maywood and Upland Ave., $950,000. Constr. in spring.

▲ Okla., Tulsa—PLANT—Dewey Portland Cement Co., 5500 Roanoke Parkway, Kansas City 12, Mo., cement plant, near here, $12,000,000. Crosby Constr. Co., 185 N. Wabash, Chicago, Ill., engr. Bids in June. CD 10-8.

▲ Tenn., Lewisburg—PLANT—Allstar Mfg. Corp., Lewisburg, plant expansion, $1,717,000. J. W. Gibson, Lewisburg consult. engr.

▲ Utah, Salt Lake City—PARKING TERRACE—Wallace-McConaughty Corp., Walker Bank Bldg., plans by Donald Parushka, Walker Bank Bldg., 10 level parking terrace, Regent and 2nd Sts., $1,000,000. Lawrence Farrant, Walker Bank Bldg., consult. engrs.

▲ Wis., Neenah—WAREHOUSE—Bergstrom Paper Co., 226 W. Wisconsin Ave., 1 story, 90 x 418 ft., concrete, concrete blocks warehouse, $1,000,000. Bids in May. Orbison & Orbison, Inc., 123 Harrison St., Appleton, consult. engrs. H. Klatt, staff engr.

▲ Que., Hauterive—PLANT—Reynolds Aluminum Co. of Canada Ltd., St. Laurent St., auto parts mfg. plant, $1,000,000.

UNCLASSIFIED

▲ Calif., Long Beach—PUMP PLANTS—City, 208 E. Broadway, salt water injection pump plants for prevention of subsidence in Wilmington Oil Field, $3,375,746. M. A. Nishkian & Co., 4754 Long Beach Blvd., consult. engrs.

▲ Calif., Ventura—SMALL CRAFT HARBOR, etc.—Ventura Port Dist., 742 E. Main St., 2,100 slip small craft harbor, berths, launching facilities, work boat, fuel docks, Pierpont Bay, $7,000,000. John A. Blume, 612 Howard St., San Francisco, consult. engrs. Bids in June.

▲+ Oklahoma—NIKE MISSILE BASE—U. S. Eng., Box 61, Tulsa, Zone 2, plans by Coston, Frankfurt & Short, 324 Madison St., Oklahoma City, Nike Missile Base, Kaw, 8 mi. east, $1,000,000 or more.

▲+ Oklahoma—NIKE MISSILE BASE—U. S. Eng., Box 61, Tulsa, Zone 2, plans by Coston, Frankfurt & Short, 324 Madison St., Oklahoma City, Nike Missile Base, Clinton-Sherman, $1,000,000 or more.

JOB:
Married Students Housing
Project, Stanford University

ARCHITECTS:
Wurster, Bernardi & Emmons
San Francisco, California

CONTRACTOR:
Williams & Burrows, Inc.
Belmont, California

MATERIAL:
Moistop — 180,000 sq. ft.
of this vapor barrier
were used.

Nels Hanson, Supt., Williams & Burrows, Inc.

MOISTOP USED FOR UNDER CONCRETE FOUND EASY TO APPLY ON BIG UNIVERSITY HOUSING JOB!

Mr. Nels Hanson, Superintendent for Williams & Burrows writes, "Everyone concerned with this project was more than pleased with the *toughness* and *ease of application* of Moistop. In my opinion, this is an excellent membrane material. It stood up remarkably well under the heavy traffic necessary to get the slab poured."

Moistop is made by combining rot-resistant Sisalkraft with a sheet of pure polyethylene film. It has amazing strength and body plus chemical inertness for permanent protection. Moistop prevents moisture migration through floors. During the pour, it also prevents any loss of the mix due to seepage into the ground or fill. It is an excellent moisture stop for foundation waterproofing or as a crawl space ground cover. Available in widths of 72", 84" and 96" — also in narrow widths for flashing. Write Dept. 10, Attleboro, Mass. for informative booklet.

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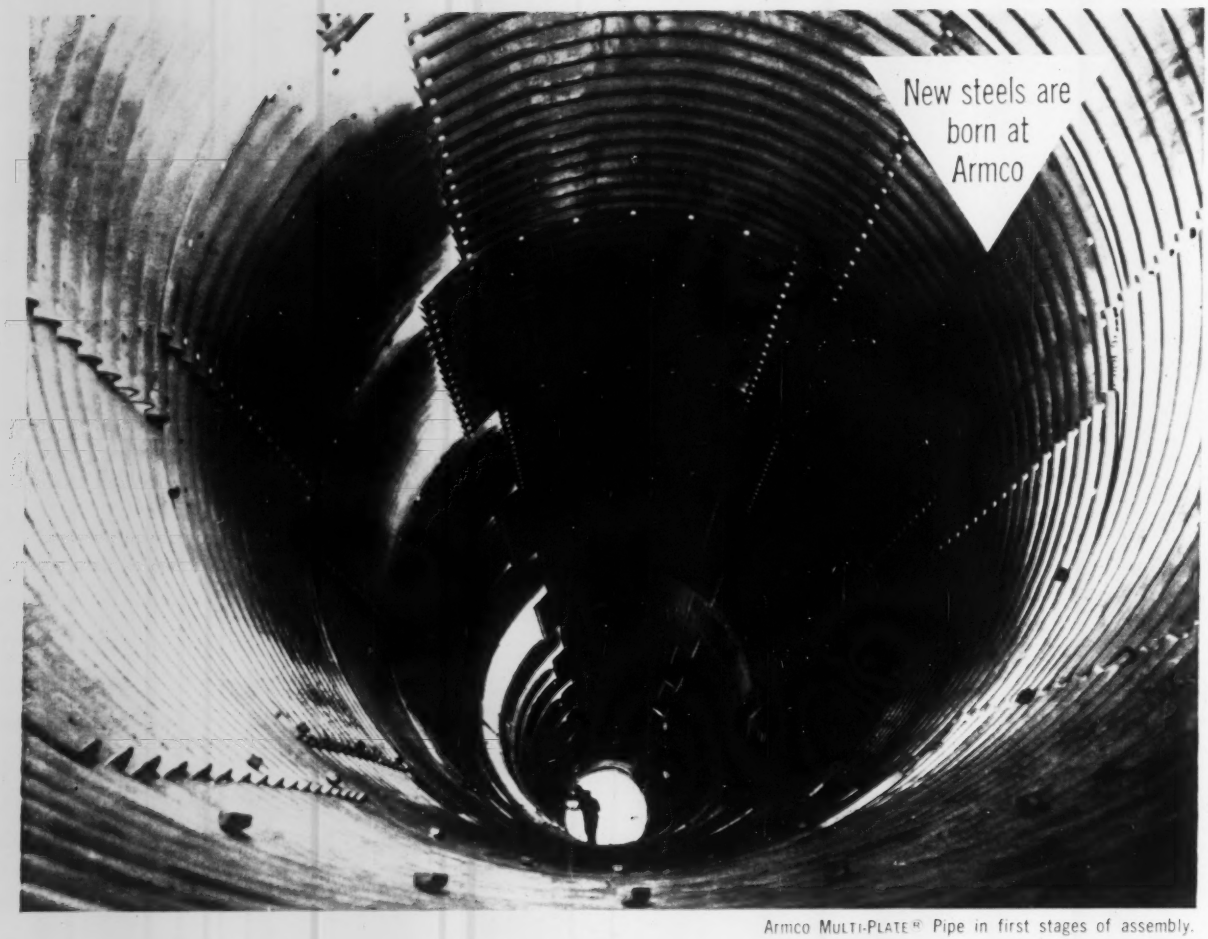
reinforced paper, foil and plastics for construction, industrial packaging and agriculture



Armco MULTI-PLATE® Pipe in first stages of assembly.

For Bridge Construction and Re-construction

HERE'S A BETTER WAY TO BUILD

Bridge construction with Armco Corrugated Metal Drainage Structures offers three advantages you can measure. Consider these facts: Bridging a stream or ravine with an Armco Structure plus an embankment saves money. The "bridge" is mostly earth! Secondly, it saves time. Modern earth-moving methods make short work of backfill. Third, maintenance is practically eliminated. And Armco Structures have a 50-year record for durability. Write us for authoritative data or assistance with your construction problem. Armco Drainage & Metal Products, Inc., 6739 Curtis Street, Middletown, Ohio. In Canada: write Guelph, Ontario.

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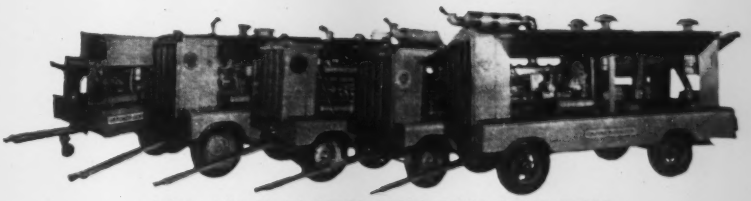
ONLY GARDNER-DENVER ROTARIES

Give you all these field-proved portable compressor advantages



Left to right, Models RP125, RP210, RP365, RP600, RP900.

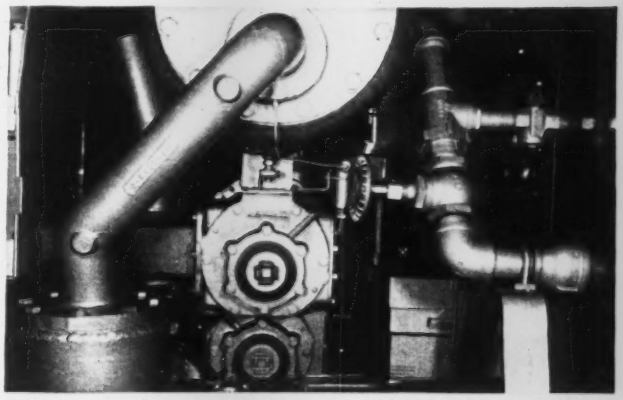
Safe, sure all-weather operation—water-oil cooling system keeps engine and compressor temperature constant.

Lubricated cold-weather starting—clutch allows compressor oil to be warmed before engaging compressor.

Positive flood lubrication—instantaneous oil flow not dependent on receiver pressure.

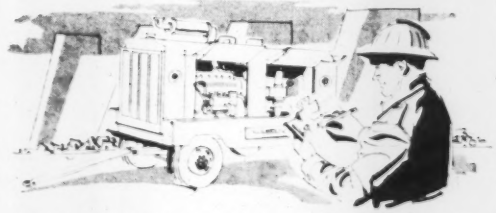
Fuel economy plus—exclusive Gardner-Denver "THRIFTMETER"® saves fuel, saves wear and tear on engine and compressor.

Simplified field maintenance—all compressor parts are easy to get to, making inspection and field maintenance faster and easier. See your Gardner-Denver distributor or write for bulletin.

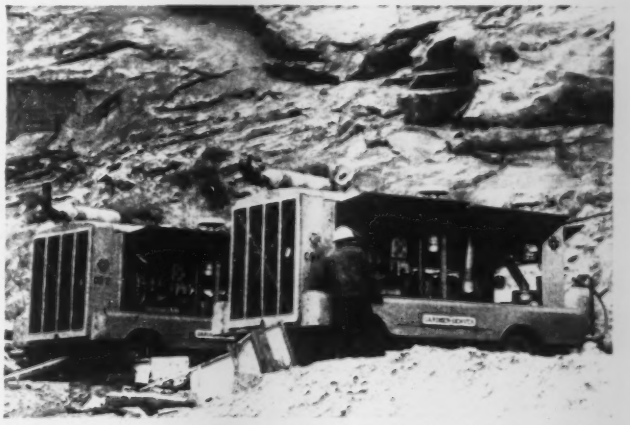


The Gardner-Denver rotary requires no major dismantling job for inspection of working parts. Only a few minutes are required to remove the 12 cap screws to expose all the blades for routine inspection or replacement that assures trouble-free operation.

KEEPING TAB ON PROGRESS



At Gardner-Denver there's no substitute for men—our philosophy of growth for 100 years. Gardner-Denver engineers know your field from field experience . . . keep in constant touch with men and machinery . . . seek new ways of developing surer, safer, more productive equipment.



Gardner-Denver RP900's on Glen Canyon diversion tunnel job provide trouble-free air for all phases of this major project.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

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YEOMANS

1999-1 N. Ruby St., Melrose Park, Ill.

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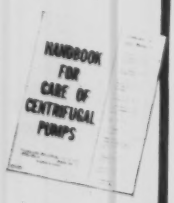
Use this coupon..for free literature on sump pumps and sewage ejectors

Catalog 3007.. describes Yeomans Heavy-Duty Wet Pit Pumps for drainage, flood water, effluent boiler blowoff, hot wells, alkalis, and acids, etc.

Manual 1114.. describes sewage ejectors, bilge pumps, and "Drain-Dri" sump pumps. Includes fixture rating table, fixture capacity estimating curve, and water friction table.

Handbook for care of centrifugal pumps (Manual 2000)..applies to pumps of *all* makes..tells how to diagnose pump ills.. suggests maintenance timetable.



YEOMANS

. . manufacturers of: centrifugal pumps . pneumatic sewage ejectors . distributors . clarifiers . mechanical aerators . digesters.

P-5908

CONSTRUCTION REPORTS

Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
April 28 Massachusetts

HEAVY CONSTRUCTION—LB & CA

▲ MASSACHUSETTS—Commonwealth of Mass., Dist. P. Wks., 100 Nashua St., Boston. Bids opened 4/14. The Bartletta Co., Inc., 10 Whipple Ave., Roslindale, Mass., LB $3,082,957, est. $3,420,433, hy. and bridge, Worcester Expressway, Interstate Rte. N90.1-90-5.7) 96, Contr. "B", Worcester, CD 4/6.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
May 14 New York
STREETS AND ROADS
May 6 New Jersey May 14 New York

▲ New York—BA 5/12—Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York, Zone 19, electrical work at Niagara Switchyard in Lewiston, Niagara County, Spec. No. PA-N-25033, Niagara Contr. No. N11. Plans $25. Uhl, Hall & Rich, 230 Congress St., Boston 10, Mass., engrs. CD 8/15/57.

▲ New York and New Jersey—BA 5/26—Port of New York Auth., 111 Eighth Ave., New York, Zone 11, Section 9 of approach roadway sys. in New York City for lower level expansion of George Washington Bridge, Contr. GWB-190.014. Plans deposit $100, addnl. sets $100 per set, not returnable. CD 8/15/57.

▲† Greenland—AIR BASE FACILITIES, etc.—BA On Or About 6/2—U. S. Eng., 346 Broadway, New York 13, N. Y., U. S. A., (a) Avgas Base Storage (CY-59) (b) Base Bulk Supply Warehouse Facility addn. (CY-59) (c) Base Theater (CY-59) (d) Bread Bakery (CY-59) (e) Eastern Extension Dew Line Support Facilities (CY-59) (1) composite bldg. (CY-59) (2) 70-men dormitory (CY-59) (3) garage (CY-59) (4) bulk fuel storage (CY-59) (5) radio communications bldg. (CY-59), at Sondrestrom Air Force Base (BW-8), ENG-30-347-59-28.

BUILDINGS—LB & CA

▲ Thomas Constr. Co., 165 Haledon Ave., Paterson, N. J., CA $1,163,800, est. $2,750,000, HIGH SCHOOL, Church St., Haledon, NORTH HALEDON, N. J. Manchester Regional High School Dist., Haledon, N. J. Bids Mar. 23. CD 4/7, under LB.

▲ Standard Constr. Co., 1010 Vermont Ave. N.W., Wash., D. C., CA Est. $3,000,000, 8 story APARTMENT, 2000 Tunlaw Rd. N.W., WASH., D. C. (Owner: E. Going & Morris Jacobs), 1302 18 St. N.W., Wash., D. C.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
May 1 Kentucky
STREETS AND ROADS
May 1 Kentucky

BUILDINGS—BA

▲ N. C., Raleigh—CITY HALL—BA 5/7—City, City Hall, 40,000 sq. ft. city hall, $1,500,000. G. Milton Small & Assocs., 611 Tucker St., archts.

HEAVY CONSTRUCTION—LB & CA

▲ LOUISIANA—State Hy. Dept., Rm. 307, Hy. Office Bldg., Baton Rouge.
LeBlanc Brothers, St. Gabriel, La., CA $1,036,758, widen, surf., existing concrete 15.747 mi., Donaldsonville and Napoleonville Hys., Rte. 1 & 22, SP 64-01-04&64-10-05, Ascension and Assumption Parishes. Bids Mar. 18, awarded Apr. 1. CD 3/23, under LB.

▲† Fordice Constr. Co., 42 Porter Bldg., Memphis, Tenn., LB $898,250, Lot 1, casting articulated concrete mattress at Delta and Vidalia casting fields, Madison and Concordia Parishes, Div. No. 59-106, LOUISIANA U. S. Eng., P. O. Box 60, Vicksburg, Miss. Bids Apr. 7. CD 3/11.
Atlas Constr. Co., Ruston, La., LB $474,875, Lot 2 (Louisiana).

BUILDINGS—LB & CA

▲ Community Builders, 8615 Cameron St., Silver Spring, Md., Owner Builds, $3,062,500, 175 HOMES, Ravenwood and Braddock Rd., ANNANDALE, VA., Greenhome, O'Mara, Dewberry & Nealon, 4610 Lee Hy., Arlington, Va., engrs.

▲ George A. Fuller Co., 1 Peachtree St. Bldg., Atlanta, Ga., LB $1,365,000, Fulton County HEALTH CENTER, ATLANTA, GA., Fulton Co. Comrs. Road & Revenues, Courthouse, Atlanta, Ga. Bids Apr. 8, CD 3/12.

SAME SLING PRINCIPLE AS IN JET PILOT HELMETS

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Slings in Gentex Safety Hats use same design principle as slings in Gentex jet flight helmets. 6-pt. suspension, 3-layer crossover at crown. Rugged polyethylene shell exceeds all Federal Safety specifications, yet the Gentex weighs within ¾ ounce of any safety hat made. No metal parts — fully non-conductive.

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Instantly adjustable, snap-in suspension sling, well-ventilated construction insure comfort for every wearer. Good-looking, too — impregnated colors can't chip or flake. Available in green, gray, white, blue and yellow — in both hat and cap models. Examine the Gentex Safety Hat for yourself.

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Full Specifications ☐ Hat for testing ☐

YOU CAN BET YOUR LIFE ON A GENTEX — world's foremost manufacturer of helmets for the military

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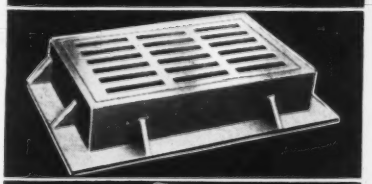
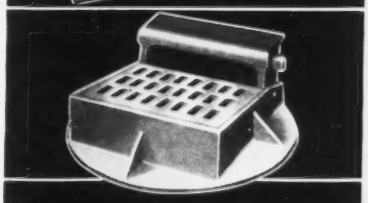
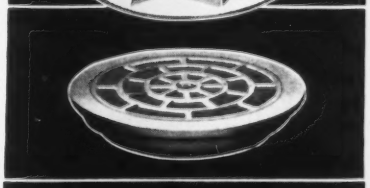
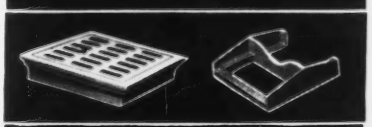
DELIVERED ON TIME









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N E E N A H
FOUNDRY COMPANY
NEENAH · WISCONSIN
Chicago Office: 5445 North Neva Ave., Chicago 31, Illinois

▲ The Galvon Constr. Co., 1925 Broadway N.E., Knoxville, Tenn.; CA. Est. $1,900,000, 3 story DIAL EXCHANGE, KNOXVILLE, TENN., Southern Bell Telephone & Telegraph Co., 51 Ivy St. N.E., Atlanta, Ga.; Sagger, Williamson, Vaught & Spicer, 739 W. Peachtree St. N.E., Atlanta, Ga., engrs. Awarded Mar. 27.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 30 Indiana — May 5 Wisconsin

STREETS AND ROADS

April 30 Indiana — May 5 Wisconsin

BUILDINGS—BA

O., Massillon—SCHOOLS—BA 5-7—Jackson Bd. Educ., Mudbrook Rd., school and school's addns., $930,000, Lawrence Dykes & Assocs., 125 Valleyview St., Canton, archts., CD 11-12.

HEAVY CONSTRUCTION—LB & CA

▲ OHIO—State Hy. Dpt., Columbus, Zone 15.
O.—A. J. Baltes, Inc., 11 Olive St., Norwalk, O., CA $2,149,631, b. conc. 3.1 mi. Type T-55 on B-20 and structures, State Rte. 7, Villages of Brilliant and Mingo Jct. and Steubenville Twp., JEF-7-11.35, Jefferson Co.
O.—C. A. Agresta Constr. Co., 4186 Greenvale Rd., Cleveland, O., CA $502,695, widn., resurf. 1.552 mi., State Rte. 82, City of Warren and Howland Twp., TRU-82-11.14, Trumbull Co.
O.—W. L. Johnson Constr. Co. & Assocs., P.O. Box 6668, Bexley Sta., Columbus, O., CA $3,935,707, b. conc. 6.643 mi. Type T-71 and structures US Rte. 62, city Columbus, Jackson and Franklin Twps., FRA-62-7.29, Franklin Co.
O.—Don S. Cisle, Contractor, Inc., 1st National Bank Bldg., Hamilton, O., CA $658,676, b. conc. 2.122 mi., State Rte. 122, Lemon Twp., City Middletown, Butler Co., and Franklin Twp., Warren Co., BUT-122-9.62, WAR-122-0.00, Butler and Warren Counties. Bids Mar. 31. Grand total $7,246,709. CD 4-9, under LB.

▲ Nick Cenci & Sons, 844 N. Cassady Ave., Columbus, O., LB $1,549,639, 6,000 ft. East-West Runway, Rigid—Columbus Airport, COLUMBUS, O. City Hall, Columbus, O. CD 3-7.

BUILDINGS—LB & CA

▲ Baker & Combs, 1960 W. Broad St., Columbus, O., CA $1,745,675, MARRIED STUDENTS HOUSING, Ohio State University, COLUMBUS, O. State Dpt. Pub. Wks., State Dpt. Bldg., Columbus, O. Bids Mar. 31. CD 4-8, under LB.

▲ Garwick & Ross, 990 W. 3rd Ave., Columbus, O., CA $1,806,406, 11 story MEN'S DORMITORY, Ohio State University, COLUMBUS, O. State Dpt. Pub. Wks., State Dpt. Bldg., Columbus, O. Bids Apr. 7. CD 4-15, under LB.

▲ Son Development Co., 258 E. Alexandersville Rd., Bellebrook, O. Owner Builds. $12,800,000, 800 Concept HOMES, at Centerville, DAYTON, O.

▲ Garwick & Ross, Inc., 990 W. 3d Ave., Columbus, O., LB $1,234,000, general contract, 11 story men's DORMITORY, Ohio State University, COLUMBUS, O. State Dpt. Pub. Wks., State Dpt. Bldg., Columbus, O. Bids Apr. 7. CD 2-19-59.

▲ Rollins Builders, Inc., P.O. Box 667, Aurora, Ill. Owner Builds. $1,000,000, 418 RESIDENCES, streets, sewers, sewage disposal plant and 5 acre park, in Sun Estates development on 132 acre tract, Bowes Rd. and McLean Blvd., ELGIN, Ill.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 30 Nebraska

STREETS AND ROADS

April 30 Nebraska — May 1 North Dakota

BUILDINGS—BA

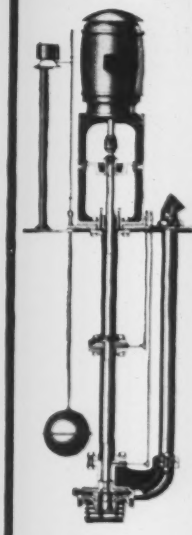
▲ Minn., Richfield (P.O. Minneapolis)—SCHOOL—BA 4-24—Bd. Educ., Junior-senior High School, Logan and Oliver Aves., South, $2,250,000, Advanced date, Thorshov & Cerny, Inc., 400 Metropolitan Bldg., Minneapolis, archts., CD 4-8.

▲ Mo., Kansas City, COMMUNITY CENTER—BA 4-24—Jewish Community Center, 1600 Linwood Blvd., 149 x 306 ft., stone, reinforced, community center, incl. 100 x 130 ft. little theatre, $1,000,000, Manuel Morris, Rav Exchange Bldg. and Robert Sachs, Assoc., 103 W. 47 St., Kansas City, Mo., archts., E. C. Massaglia & Assocs., Plaza-Ark Bldg., engrs., CD 6-18-56.

▲ S. D., Rapid City, HOUSING—BA On Or About 6-1, Base Procurement Officer, Base Theater, Ellsworth Air Force Base, Capehart Housing, consisting 220 family housing units, Ellsworth Air Force Base, IFB-59-601-59-72. Plans, depos. $150, CD 4-24.

HEAVY CONSTRUCTION—LB & CA

▲ NORTH DAKOTA, State Hy. Dpt., Bismarck.
N. D.—Schultz & Lindsay Constr. Co., 3201 Broadway, Fargo, N. D., CA $1,447,523, gr. conc. 8.764 mi., Proj. FAS-9-(3) 194-345, Cass Co., Bids Apr. 3.



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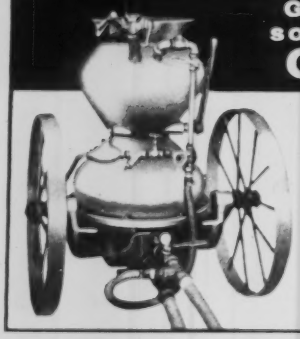

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N. D.—Wm. Collins & Sons, Inc., 500, 2nd Ave. N., Fargo, N. D., CA $541,474, base, bit. surf., 15.255 mi., Proj. F-298(7), Stutsman Co.

N. D.—Peter Kiewit & Sons Co., 1024 Omaha National Bank Bldg., Omaha, Neb., CA $170,052, stockpiles, Proj. SAP-1337, Dickey, Stutsman and LaMoure Counties.

N. D.—Art Schimkat, 124 N. Washington, Pierre, S. D., and A. W. Schnuerle, S. Hy. 281, Aberdeen, S. D. (joint venture), CA $511,636, base, bit. surf., 11.491 mi., Proj. F-262(10), Sioux Co.

N. D.—Megarry Bros., 437 33 Ave. N., St. Cloud, Minn., CA $146,264, stockpiles, Proj. SAP-1336, Richland and Cass Counties.

N. D.—Archie Campbell, Inc., New Rockford, N. D., CA $136,877, base, bit. surf., 6.75 mi., Proj. CS-93(9), Williams Co. Grand total $2,953,826. CD 4-8, under LB.

▲ KANSAS

Kan.—L. G. Barcus & Sons, Inc., 1430 State Ave., Kansas City, Kan., CA $514,278 (4 bidders), substructure River Piers No. 12, 13, 14 & 14-C, Bridge No. 70-105-17.6, Station 70 plus 60, SP 70-105 I 70-6(111)423, Wyandotte Co.

Kan.—Kansas City Structural Steel Co., 21st and Metropolitan, Kansas City, Kan., CA $991,933 (5 bidders), superstructure river spans steel truss, 2 units-300 ft. and ramp, 1 unit-300 ft. 8 in., Bridge No. 70-105-17.6, Sta. 70 plus 60, SP-70-105 I 70-6 (111) 423, Wyandotte Co. Bids Apr. 9. CD 3-20.

▲ M. A. Swatek & Co., 1137 W. 2nd St., Oklahoma City, Okla., CA $1,248,439, est. $1,256,000, water main extens., West Reno to Western Electric plant, OKLAHOMA CITY, OKLA., City of Oklahoma City, City Hall; Oklahoma City, Okla. Bids Mar. 31. Awarded Apr. 8. CD 3-17.

▲ L. H. Lacy Co., Contractors, 5630 Yale Blvd., Dallas, Tex., LB $1,264,042, exten. 2 runways, Houston International Airport, HOUSTON, TEX., City, City Hall, Houston, Tex. CD 9-18.

▲† Refinery Engineering Co., Div. Vitro Corp. of America, 405½ Broadway, Farmington, N. M., CA $1,598,349, 15.2 mi. First Section of Southside Canal of Colbran Project, West Central, Spec. 5155, COLORADO River Storage Project, Bureau Reclamation, Dept. Interior, Box 780, Grand Junction, Colo. Bids Mar. 17. CD 3-19, under LB.

▲† Refinery Engineering Co., 405½ Broadway, Farmington, N. M., LB $2,425,168, est. $2,903,529 (11 bidders) upper and lower Molina Penstocks power plants and equalizing reservoir, Colbran Project, Mesa County, DC 516, COLORADO River Storage Project, Bureau Reclamation, Dept. Interior, Grand Junction, Colo. Bids Apr. 14. CD 4-6.

BUILDINGS—LB & CA

Adolfson & Peterson, 2817 Bryant Ave. South, Minneapolis, Minn., CA $987,000, general constr., 1 and 2 story, Maplewood HIGH SCHOOL, NORTH ST. PAUL, MINN., Bd. Educ., 14 Twelfth Ave. N.E., North St. Paul, Minn. Bids Apr. 2. CD 4-9, under LB.

▲ M. W. Watson Constr. Co., 1004 First National Bank Bldg., Topeka, Kan., CA $1,664,750, est. over $1,000,000 (8 bidders), unit A, 1 story, irregular shape GROCERY WAREHOUSE, with offices, freezer room; Unit B, 1 story, 41 x 222 ft. concrete block, brick WAREHOUSE, TOPEKA, KAN., The Fleming Co., Inc., 820 Quincy, Topeka, Kan., Cooper-Robinson-Carlson-O'Brien, 418 Commerce Trust Bldg., Kansas City, Mo., archts. Bids Mar. 24, awarded Mar. 25.

▲ Ben C. Wileman, 5103 N. Shartel St., Oklahoma City, Okla., Owner-Builds, $1,000,000, 320 acre RESIDENTIAL SUBDIVISION DEVELOPMENT, N. 23rd and Meridan Sts., OKLAHOMA CITY, OKLA. CD 10-20.

▲ Saigert Constr. Co., 1401 N. 4th St., Waco, Tex., LB $1,379,100, Base Bid, est. $1,250,000-$1,750,000 (20 bidders) general contract 3 and 4 story, 110,000 sq. ft., frame, 570 student men's DORMITORY, concrete fdn., WACO, TEX., Baylor University, 1401 S. 5th St., Waco, Tex. Bids Apr. 7. CD 3-18.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 13 California

▲† Calif., Lompoc—LAUNCH and SERVICE FACILITIES—BA 5-5—U. S. Eng., 751 S. Figueroa St., Los Angeles, launch and service facilities, SM 65-T, missile launch complex (Phase I) Vandenberg Air Force Base, ENG-04-353-59-83.

Calif., Palos Verdes Estates—BA 5-19—Palos Verdes Estates, 2512 Via Tejon, 76,748 lin. ft. 8 in. concrete sanitary sewers, Assessment Dist. No. 2, $994,000, Plans deposit $50, South Bay Engineering Co., 43 Malaga Cove Plaza, engr. CD 4/3, under LB.

▲† Calif., Lemoore—OPERATIONS AREA FACILITIES—BA 5-20—Dist. Pub. Wks. Office, 12th Naval Dist., Room C112, San Bruno, operations area facilities, Naval Air Station, NAy-20963, Spec. 20963-58, $1,000,000. CD 9-8.

▲ Wash., Bellevue—BA 5-22, Bellevue Sewer Dist., 47 mi. sewers and 15 pumping stations, $3,650,000, R. W. Beck & Assocs., Tower Bldg., Seattle, consult. engrs. CD 6-27-56.

BUILDINGS—BA

▲† Calif., Concord—GUIDED MISSILE SUPPORT FACILITIES—BA 5-13—Dist. P. Wks. Office, 12th Naval Dist., Room C112, San Bruno, guided missile support facilities, U. S. Naval Ammunition Depot, $1,000,000, CD 6-18.

Continued on page 94

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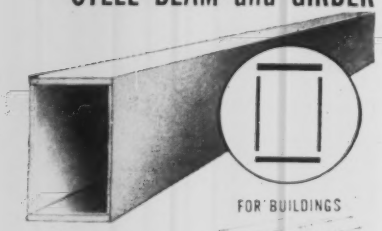

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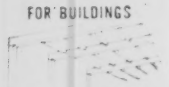

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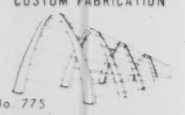

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(Continued from page 92)

BUILDINGS—SLC

▲ Utah, Roy (HOMES — Suburban Homes & Developments, 3715 Riverdale Rd., Ogden, soon lets contract 110 brick homes, $1,000,000.

▲ ARIZONA (State Hy. Dpt., 206 S. 17 Ave., Phoenix, Ariz.: T. M. K. Constr. Co., 2815 S. 40 St., Box 106, Phoenix, Ariz., CA $1,074,872, select material aggregate base, bit. plant mix plant mixed seal coat, seal coat and 4 overpass structures beginning approx. 3 mi. west of Gila Bend and extending westerly over US Rte. 80 approx. 7 mi. toward Yuma-Casa Grande Hy.

Ariz.—Phoenix-Tempe Stone Co., 1910 W. Broadway, Phoenix, Ariz., CA $187,404, clearing, grubbing, grading, select material 4.2 mi. Kirkland-Prescott Hy., beginning at Skull Valley and extending over new alignment of county road to Kirkland, Yavapai Co. Bids Mar. 31. CD 7-31-57.

▲† Kirst Constr. Co., 836 W. Woodbury Rd., Altadena, Calif., LB $2,416,505 (7 bidders), B-3 Dalton Wash Channel and Little Dalton Wash Diversion Channel, Glendora, ENG-04-353-54-24, CALIFORNIA, U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Apr. 14. CD 3-3-23.

▲† Matich Bros. & M. M. Sundt Constr. Co., Box 340, Colton, Calif., LB $5,912,018 (10 bidders), training base facility, WS 107A-2, incl. missile silos, terminals, control center pads, test mast bases, 10 tunnels, blast doors, loading signal alarm and fire sys. and utilities, Vandenberg Air Force Base, ENG04-353-56-65, LOMPOC, CALIF., U. S. Eng., 751 S. Figueroa, Los Angeles, Calif. Bids Apr. 14. CD 2-26.

BUILDINGS—LB & CA

▲ Myers Bros., Contractors, 3307 San Fernando Rd., Los Angeles, Calif., CA Est. $1,000,000, 112,500 sq. ft. tilt-up concrete slab paper cup PLANT, 1141 South St., ANAHEIM, CALIF., Dixie Cup Div., American Can Co., 24th and Dixie Dr., Easton, Pa.; Giles & Robert Clements, Van Nuys Bldg., 210 W. 7th St., Los Angeles, Calif., archts.

Miles Constr. Co., 392 "E" St., Chula Vista, Calif., CA $804,492, 81 frame, stucco DWELLINGS, Garden, Eileen and Harness Sts., Mount Miguel Tract, LEMON GROVE, CALIF.

▲ Air Conditioning Co., Inc., 6265 San Fernando Rd., Glendale, Calif., CA $1,000,000, HOTEL alterations, LOS ANGELES, CALIF., Corrigan Real Estate, 515 S. Olive St., Los Angeles 13, Calif.; Heitschmidt & Thompson, 617 W. 7th St., Los Angeles, Calif., archts.; J. L. Hemstiter, 1621 Beverly Blvd., Los Angeles, Calif., engr.

▲ Sherman H. Johnson, Contractor, 10129 Weaver St., El Monte, Calif., CA $1,152,395, JUNIOR and SENIOR BOYS' CAMP, La Verne, Stephens Ranch, LOS ANGELES, CALIF., Bd. Supervs., Los Angeles County Hall of Records, Los Angeles, Calif. Bids Mar. 18. CD 1-24, under LB.

▲ Johnson, Drake & Piper, Inc., 9909 San Leandro Blvd., Oakland, Calif., CA $1,164,300, 5-story, 55,000 sq. ft. COUNTY HEALTH BLDG., OAKLAND, CALIF., Alameda County Courthouse, Oakland, Calif. Bids Mar. 24. CD 4-7, under LB.

† Carl N. Swenson Co., Inc., P.O. Box 558, San Jose, Calif., LB $937,600, 1-story, 160,000 sq. ft. concrete tilt-up constr., steel, DEVELOPMENT CONTRACTOR, OFFICE, ENG-59-29, SUNNYVALE, CALIF., U. S. Eng., 180 New Montgomery St., San Francisco, Calif.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
May 6—13 Ontario

BUILDINGS—SLC

Ont., Guelph, COLLEGE, ENT. [illegible] Agric. Dairy College Addition, steel lets soon, [illegible] College Unit, Woolwich St., $850,000. Peter [illegible] & Van Dusen, [illegible] & Allen, [illegible] Thursday, [illegible] & Allen, [illegible] 6-10-58.

HEAVY CONSTRUCTION—LB & CA

▲ ALBERTA, Dept. P.W., [illegible] Bldg., Drumheller, [illegible] 3-3.

W. C. Arnett & Co., Ltd., P.O. Box 575, Calgary, Alta., LB $1,110,925, [illegible] & Allen, [illegible] Thursday, [illegible] & Allen, [illegible] 6-10-58.

BUILDINGS—LB & CA

▲ A. R. Grimwood Ltd., 1139 Kingsway, Vancouver, B.C., CA $1,774,224, [illegible] Secondary School, Hastings and Renfrew Sts., Vancouver, B.C., Vancouver School Bd., [illegible] Sharp & Thompson, Berwick & Pratt, archts., Vancouver, B.C. Bids Mar. 24. [illegible] 3-28.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ Greece, AID, [illegible] 6-13, Greece, A.T. [illegible] Certificate of P.W., M.Ly. [illegible] St., Athens, [illegible] $2,801,000. CD 3-26.

▲† Canal Zone, [illegible] 6-12, Panama Canal Co., [illegible] Bldg., Balboa, [illegible] Dpty. Attorney, [illegible] N. Parker, [illegible] 415 Bldg., St. Louis, Mo., [illegible] 3-28.

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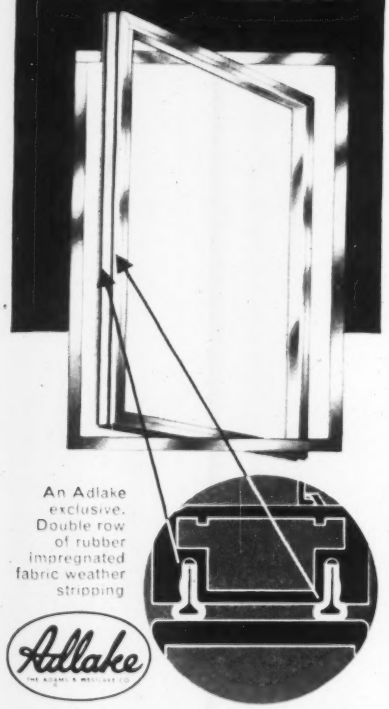

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Construction Scoreboard

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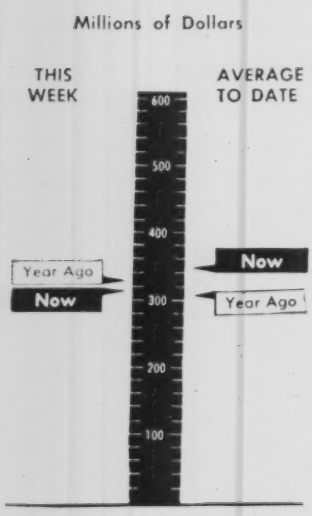


AMOUNT OF CONTRACTS LET

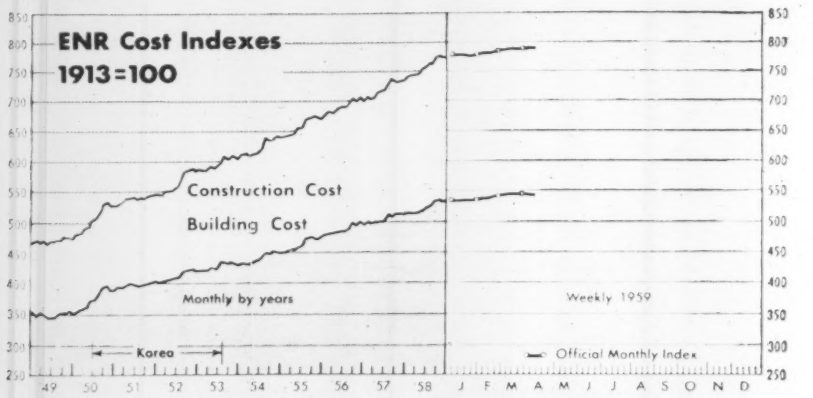
By Ownership	This Week millions	Cum. 17 wks 1959	Chge '58-'59 %
All Heavy Constr.	$314.3	$6,093.6	+25
PRIVATE	141.2	2,910.1	+13
PUBLIC	173.1	3,183.5	+12
State & Municipal	126.6	2,239.8	0
Federal	46.5	943.7	+56
By Type of Work			
PUBLIC			
Waterworks	11.2	141.1	+64
Sewerage	18.0	190.0	+ 6
Bridges*	6.8	191.4	+28
Highways	38.9	867.0	— 2
Earthwork, Waterways	8.2	263.3	+11
Buildings, Excl. Housing	47.4	842.8	+16
Housing	32.4	206.6	—39
Unclassified	10.3	481.4	+91
PRIVATE			
Buildings			
Mass Housing	77.1	1,260.4	+ 8
Commercial	19.1	697.3	+16
Industrial	37.6	821.9	+27
Unclassified	7.3	130.4	15

*Includes private bridges

NOTE: Minimum size projects included are: Waterworks and waterways-$53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

CAPITAL . . .

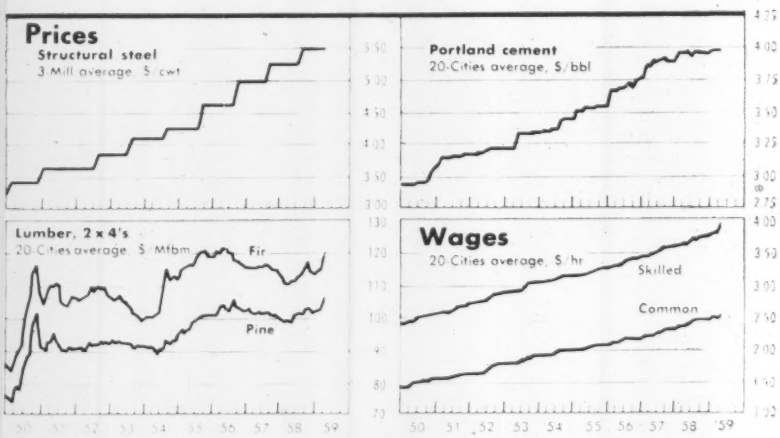
New Capital For Construction	Week of April 16 millions	Cum. 16 wks 1959	Chge '58-'59 %
Corporate Securities	$70.7	$1,174.1	—39
State and Municipal:			
All Except Housing	251.5	2,022.7	— 6
Housing		30.6	+ 1
Federal Loans		34.3	—45
Federal Aid			
Total Nonfederal	$322.2	$3,261.6	—21
Federal Appropriations:			
Projects in U. S.			—100
Outside U. S.			
Total New Capital	$322.2	$3,261.6	—31



CURRENT COST INDEXES

ENR INDEXES (1913 = 100), 20-cities' average 1959	Week of Apr. 16	% Change from Mar. 19 1959	% Change from Apr. 17, 1958
Construction Cost	785.85	+0.3	+5.2
Building Cost	542.63	0	+5.2

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 1.770; Building Cost by 1.516.



ENR COST INDEXES IN 22 CITIES, 1913 = 100

City	Construction Cost Apr. 1959	Construction Cost % Change from last Month	Construction Cost % Change from last Year	Building Cost Apr. 1959	Building Cost % Change from last Month	Building Cost % Change from last Year
Atlanta	594	0	+6.5	477	0	+4.6
Baltimore	711	0	+5.0	544	+0.2	+3.8
Birmingham	624	+0.3	+5.2	498	+0.6	+4.6
Boston	813	+0.4	+6.4	555	+0.7	+6.3
Chicago	868	+0.2	+4.0	570	+0.2	+8.2
Cincinnati	785	0	+6.0	525	0	+4.8
Cleveland	893	0	+5.4	539	0	+5.3
Dallas	573	0	+4.8	472	0	+4.4
Denver	731	0	+0.8	532	0	+1.7
Detroit	899	+0.2	+5.5	581	+0.3	+6.6
Kansas City	793	+2.6	+4.1	548	+1.9	+4.0
Los Angeles	833	+0.6	+7.8	541	+0.9	+6.7
Minneapolis	839	0	+4.5	554	0	+3.2
New Orleans	620	+0.5	+6.0	496	+0.4	+4.4
New York	971	+0.4	+6.8	632	+0.5	+6.6
Philadelphia	804	+1.6	+3.7	583	+2.3	+3.9
Pittsburgh	827	0	+2.9	595	0	+4.6
St. Louis	854	0	+5.3	576	0	+4.9
San Francisco	823	+0.7	+8.0	544	+1.1	+7.3
Seattle	834	+0.5	+6.2	497	+0.8	+6.7
U. S. 20 Cities' average	784	+0.4	+5.1	543	+0.6	+5.0
Montreal	603	0	+3.3	449	0	+0.7
Toronto	649	+1.1	+6.9	493	+1.9	+4.9

One in a series of technical reports by Bower

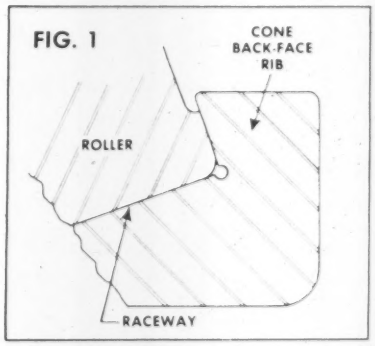
BEARING BRIEFINGS

BEARING GEOMETRY MAKES OR BREAKS BEARING PERFORMANCE

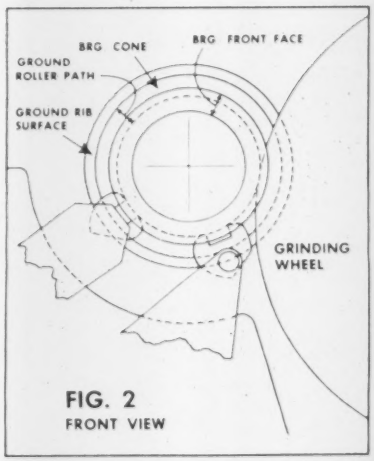
To develop high capacity and optimum performance in a tapered roller bearing, it is essential that roller alignment be accurate. Correct roller alignment, in turn, depends on a critical geometric relationship between the cone back-face rib, and the cone raceway.

Perfection in this geometric relationship compels the rollers to align themselves perfectly with respect to the bearing geometry, and each roller shares equally in the work that is imposed. Figure 1 diagrams the important elements involved.

When this rib-to-raceway relationship is incorrect (because of either faulty bearing design or manufacturing inaccuracies), rollers experience misalignment and begin to skid and skew under load. As engineers know, poor performance and premature bearing failure are inevitable under these conditions.

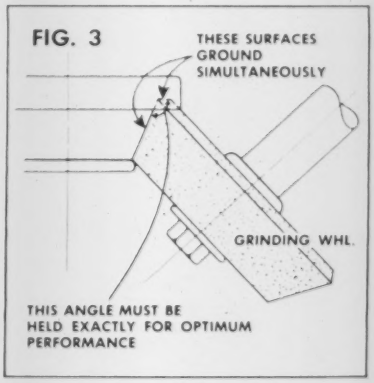


In the design and manufacture of Bower tapered roller bearings, Bower engineers take great care to generate and hold an exact face angle on the cone back-face rib. In practice, this means that Bower bearings are designed for maximum life and optimum performance under any operating conditions. It means that Bower bearings retain accurate roller alignment under all speeds and loads up to the maximum for which the bearing is rated.



It's one thing to develop proper bearing design on paper, but quite another to carry it out consistently in manufacture. To this end, Bower engineers were instrumental in the design and development of a unique centerless grinder on which Bower precision grinds each bearing's cone raceway and rib-face simultaneously. The results obtained from these machines invariably meet or surpass Bower's exacting requirements and assure perfect roller alignment.

Figures 2 and 3 are front and side views which illustrate Bower's technique of centerless grinding rib-faces and cone raceways together. As a result, every component in a Bower bearing is perfectly concentric about its rolling axis.



★ ★ ★ ★

When you require bearings, we suggest you consider the advantages of Bower bearings. Where product design calls for tapered or cylindrical roller bearings or journal roller assemblies, Bower can provide them in a full range of types and sizes. Bower engineers are always available, should you desire assistance or advice on bearing applications.

BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION – FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICHIGAN

Bonds to Finance Interstate?

Congressional support for the idea is growing stronger; next month should bring some kind of action

The wheels are finally starting to move in Congress to provide the billions needed for the Interstate Highway program. The issue will be brought into the open in the next few weeks. Now the legislators are maneuvering behind the scenes to iron out major differences. When the results are in, bond financing may be in the spotlight (ENR April 16, p. 21).

Congress and the Administration don't see eye to eye on how to raise money for the Highway Trust Fund, which is rapidly running out. The Administration wants to raise the gasoline tax. Congressmen don't like the idea.

There's talk in Congress of a number of ideas. But there is growing interest in some form of bond financing.

The House Ways and Means Committee plans to tackle the highway financing problem early next month. But a tip off on how the wind is blowing may come when the House Public Works Committee meets May 5-7 to consider other highway legislation.

Bond financing for the Interstate is not a new idea. It was proposed by the original Clay Committee study that led to adoption of the program.

Congress overrode Administration support of bond issues then, preferring increased taxes. Now some of the opponents of the initial bond financing proposal—Sen. Robert S. Kerr (D., Okla.) and Rep. Wilbur Mills (D., Ark.), for example—are ready to accept bond financing instead of higher highway user taxes.

Considered most acceptable to the Administration would be the sale of bonds at market prices by a public corporation or agency not subject to the public-debt ceiling. This means the earmarked highway user taxes would go to debt service (interest and bond retirement). Being revenue bonds, issued by a separate agency, these securities would not tip the fiscal 1960 budget into deficit.

Democrats pushing the idea of highway bonds have a different idea. They propose that the Treasury advance needed funds to the highway program at a nominal interest rate, perhaps 2%. The Treasury would then borrow on the open market at higher rates to replace needed money previously drained into the Trust Fund.

Congress already has established a similar system for the Rural Electrification Administration. It borrows from the Treasury at 2%. The Treasury has to borrow at market rates, currently in the range of 3½ to 4%. The Administration is urging the elimination of this money-losing proposition.

Some Congressional sources predict that some form of low-interest highway bond operation can be "forced" on the Administration. They reason this way:

Additions to the Trust Fund are needed for only a couple of years to bail the road program out of its immediate predicament. Then, in 1961, the Bureau of Public Roads will give Congress two reports. One will update highway cost estimates, and the other will make user-charge recommendations. The user-charge study will show which groups should pay what proportion of the taxes based on damage to the roads, and the use and benefits the various users derive.

These reports probably will be the basis of new legislation in 1961. Thus, the immediate money needed amounts to about $1 billion to cover the deficit in apportionments for 1961 and 1962.

To gain their point with the Administration, those favoring the low-interest bond plan could threaten the Administration with further diversion of excise taxes to the Trust Fund.

This July 1, the existing excise tax on new cars is due to drop from its present 10% to 7%. The tax on automotive parts is scheduled to drop from 10% to 8%. The Administration already has asked Congress to hold these levies at 10%, because the funds go to the Treasury for operation of the government.

Any move by Congress to continue the levies at the present levels, but earmark 3% of the car tax and 2% of the parts tax for the Trust Fund would surely be strongly opposed by the Administration. The Treasury would lose approximately $400 million a year.

New funds are needed because the cost of the highway program has mushroomed far above the financing program Congress adopted in 1956 to pay for the new system.

Contractor Tax Hike Will Hurt

West Virginia lawmakers may have cut off the state's financial nose to spite its face. In the final 15 minutes of a 60-day session, the legislature raised the gross business volume tax on contractors and 11 other types of business from 2% to 2.6%.

As a result, the state will be able to buy less construction and other goods because prices will reflect the bigger tax.

Moreover, contractors holding public and private work contracts for jobs not scheduled for completion until after July 1 will have to take the larger tax bite out of their net profit. Those that lose money on a job will log a larger loss in the ledger.

The construction industry is bitter after sitting through a lesson in the art of lobbying. In the search for additional funds, it was first proposed that a new tax be levied on professional people—lawyers, doctors, engineers, architects. Representatives of these groups fought the suggestion.

While the fight raged, the constitutional deadline for adjournment drew close, with the legislature still $5.4 million short of additional general revenues. After a hasty conference, the legislators rammed through a bill raising 12 of the 21 classifications under the existing business and occupation tax laws. Contractors were among the dozen.

Contractors are taxed on the basis of gross sales. The levy, as of July 1, will go to $2.60 per $100 of gross business from the current $2 per $100 of gross business.

The lawmakers also saw to it that the state will get the tax from out-of-state contractors. An amendment to the bill requires that employers of nonresident contractors be held liable for the tax. The bill provides that owners withhold the amount of the state tax from the final settlement with out-of-state contractors. It will then be up to the contractor to pay the tax to the State Tax Department. Upon payment, certification of payment will be given the contractor, who will go to the owner and obtain the amount withheld.

The Associated General Contractors in West Virginia is attacking the law, but admits nothing can be done immediately. Gene Brown, executive

Operator training a problem?

Look how Michigan Scrapers licked it for this N.J. contractor

Take a look at the operators on Sallcon Incorporated's scrapers. You're liable to see a new man every week or two. The reason is the high cost of labor. Handling mostly small contracts, this Somerville (New Jersey) firm frequently finds it most economical to lay off men between jobs—then rehire when they go onto a new site. "In half a month's time," explains Jim Seibert, company president, "we may be forced to use two or more different operators per machine."

Clutching—none

"Under these conditions, it's naturally important to us that scrapers be as easy to operate and as easy to take care of as possible," continues Mr. Seibert. "We looked at them all . . . and decided on 10½ yard Model 110 Michigans. *Their power steer, power shift, and torque converters take the effort out of moving dirt!* New operators become pretty proficient after only a few cycles. Nobody wears away clutches, because there is no foot clutch. Gear selection is no longer critical; torque converter drive automatically balances speed and load.

"Michigan's hydraulic system is simple to master, also. The power train is easy to get at. What's more, based on our experience of last season, I feel Michigan 110's will prove extremely dependable over their entire working life."

Output—160 pay yds hourly on 500 ft cycles

Production has been very good! On a typical housing development job, cutting roadways, each Michigan averaged 20 loads per 50-minute hour. One-way hauls were approximately 250 ft. Loading, with 85 hp pusher, took 40 to 45 seconds. Payloads in clay averaged 8 bank yards.

On tougher jobs—cutting railroad sidings and excavating industrial basements, for example—the 162 hp Michigans frequently are teamed with a 140 hp pusher (which cuts load time to 25 to 30 seconds).

Self-loads satisfactorily

Occasionally they work alone, self-loading close to their 8 yd struck capacity.

In tight-quarter assignments—like grading between houses and building driveways—their power steer and short turn radius speed cycles.

The machines drive everywhere under their own power. Speeds up to 31½ mph.

Check Michigan Scraper advantages on your job

Mobility, versatility, output—*and ease of operation like this*—we think, can help you too. For proof, we'd like to *show* you, first-hand, what Michigan Scrapers can do on the only job you *really* care about—*your own!* Let us bring a demonstrator to your work area. Let your own operators run it. Measure output. Compare performance. Then pick the size you need! Three models available, 10½, 19, 29 yds heaped.

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

2401 Pipestone Road
Benton Harbor 13, Mich.

In Canada:
Canadian Clark, Ltd.,
St. Thomas, Ontario

secretary of the association, says an estimated $100 million worth of construction work is under contract in the state, including projects in the Interstate Highway System. He says a large amount of this work will not be completed before the July 1 deadline. All work not finished and paid for by then will be subject to the higher levy.

The large contractors will suffer the most, says Mr. Brown, because they generally operate on a small profit margin. "Many of these probably will lose half of their profits by being forced to pay the retroactive tax," he says.

The association is taking whatever consolation it can from the fact that out-of-state contractors will be under the same handicap as the residents.

State officials estimate the increase will bring in more than $1.5 million annually, perhaps closer to $2 million.

One thing is certain: Contractors are not going to wait until the next session of the legislature in January to start their attack on the tax.

The first assault probably will be launched on the newly created Joint Tax Study Commission. The legislature established the body to do a complete study and diagnosis of West Virginia's perennial revenue difficulties. Members of the 15-man group are expected to be named shortly by the governor, the speaker of the House and the president of the Senate.

State Highway Programs 1958 and 1959

Reported by State Highway Departments to ENR, in thousands of dollars, tollroads excluded

(See story on p. 21)

STATE AND REGION	TOTAL CONTRACTS Scheduled 1959	TOTAL CONTRACTS Let 1958	TOTAL CONTRACTS Percent Change	INTERSTATE CONTRACTS Scheduled 1959	INTERSTATE CONTRACTS Let 1958	INTERSTATE CONTRACTS Percent Change	ABC FEDERAL AID CONTRACTS Scheduled 1959	ABC FEDERAL AID CONTRACTS Let 1958	ABC FEDERAL AID CONTRACTS Percent Change	STATE AID ROADS Scheduled 1959	STATE AID ROADS Let 1958	STATE AID ROADS Percent Change
Maine	$32,400	$35,600	− 9	$20,000	$20,500	− 2	$11,000	$14,300	− 23	$1,400	$800	+ 75
New Hampshire	32,400	28,900	+ 12	17,900	15,200	+ 18	10,500	11,300	− 7	4,000	2,400	+ 67
Vermont	26,300	18,792	+ 40	20,000	5,600	+257	6,000	12,659	− 53	300a	533a	− 44
Massachusetts	140,200	128,187	+ 9	92,000	59,888	+ 54	38,000	54,990	− 31	10,200	13,309	− 23
Rhode Island	14,446	17,816	− 19	5,817	5,730	+ 2	8,629	12,086	− 29	.....	.....	.....
Connecticut	n.a.	(50,400)	.....	n.a.	(9,900)	.....	n.a.	(33,500b)	.....	n.a.	(7,000)	.....
NEW ENGLAND	**245,746**	**229,295**	**+ 7**	**155,177**	**106,918**	**+ 46**	**74,129**	**105,335**	**− 30**	**15,900**	**17,042**	**− 7**
New York	266,200c	302,265	− 12	108,800c	118,286	− 8	114,000c	148,234	− 23	43,400c	35,745	+ 21
New Jersey	111,595f	39,645g	+182	62,046h	17,980g	+245	42,473f	20,732g	+105	7,076f	927g	+663
Pennsylvania	200,000g	240,235	− 17	80,000	101,790	− 21	115,000	129,607	− 11	5,000	8,838	− 43
Maryland	63,500	53,000	+ 20	31,000	6,500	+377	28,000	28,500	− 2	4,500	18,000	− 75
District of Columbia	63,550	20,122	+216	36,326	8,165	+345	23,424	9,885	+137	3,800	2,072	+ 83
Delaware	16,000	10,000	+ 60	6,000	1,000	+500	9,000	8,000	+ 13	1,000	1,000	0
MIDDLE ATLANTIC	**720,845**	**665,267**	**+ 8**	**324,172**	**253,727**	**+ 28**	**331,897**	**344,958**	**− 4**	**64,776**	**66,582**	**− 3**
Virginia	114,004	70,953	+ 61	80,060	33,500	+139	33,944	37,453	− 9	.....	.....	.....
West Virginia	67,000	58,001	+ 16	46,000	39,147	+ 18	15,000	13,228e	+ 13	6,000	5,626	+ 7
North Carolina	65,000	63,000	+ 3	30,000	25,000	+ 20	30,000	34,000	− 12	5,000	4,000	+ 25
South Carolina	82,500	86,400	− 5	38,000	47,500	− 20	33,000	35,400	− 7	11,500	3,500	+229
Georgia	140,700	97,406	+ 44	65,000	28,591	+127	60,000	60,307	− 1	15,700	8,508	+ 85
Florida	152,000	110,200	+ 38	71,000	33,800	+110	45,000	43,600	+ 3	36,000	32,800	+ 10
Alabama	88,000	69,946	+ 26	50,000	30,591	+ 63	35,000	35,207	− 1	3,000	4,148	− 28
Mississippi	61,750	46,222	+ 34	35,500	12,203	+191	25,000	32,218	− 22	1,250	1,801	− 31
Louisiana	125,000	123,600	+ 2	60,000	39,200	+ 53	33,000	52,200	− 37	32,000	31,600	+ 1
Kentucky	105,000	110,800	− 5	45,000	44,000	+ 2	35,000	40,200	− 13	25,000	26,600	− 6
Tennessee	124,800	93,594	+ 33	77,800	37,203	+109	24,000	29,349	− 18	23,000	27,042	− 15
SOUTH	**1,125,754**	**929,522**	**+ 21**	**598,360**	**370,735**	**+ 61**	**368,944**	**413,162**	**− 11**	**158,450**	**145,625**	**+ 9**
Ohio	208,000	280,642	− 26	70,000	159,046	− 56	88,000	97,116	− 9	50,000	24,480	+104
Indiana	116,675	103,665	+ 13	65,851	41,160	+ 60	48,824	61,505	− 21	2,000	1,000	+100
Illinois	60,000	240,000	+ 8	162,000j	87,000	+ 86	94,000	129,500	− 27	4,000	23,500	− 83
Wisconsin	190,000	95,000	+ 5	52,000	42,000	+ 24	43,000	47,000	− 9	5,000	6,000	− 17
Michigan	224,000	167,000	+ 34	100,000	66,000	+ 52	93,000	60,000	+ 55	31,000	41,000	− 24
MIDDLE WEST	**908,675**	**886,307**	**+ 3**	**449,851**	**395,206**	**+ 14**	**366,824**	**395,121**	**− 7**	**92,000**	**95,980**	**− 4**
Minnesota	122,000	98,303	+ 24	55,000	19,821	+177	47,000	55,182	− 15	20,000	23,000	− 13
Iowa	119,000	111,300	+ 7	46,000	35,800	+ 28	53,200	57,200	− 7	19,800	18,300	+
Missouri	96,000	99,165	− 3	54,000	49,871	+ 8	42,000	48,231	− 13	0	1,063	−10[0]
Arkansas	n.a.	(33,633g)	.....	n.a.	(11,047g)	.....	n.a.	(22,140g)	.....	n.a.	(446g)	.....
North Dakota	49,200	40,248	+ 22	32,000	16,347	+ 96	16,700	23,281	− 28	500	620	− 19
South Dakota	54,530	38,403	+ 42	34,530	15,205	+127	19,220	22,740	− 15	780	458	+ 70
Nebraska	46,000	40,656	+ 13	20,000	9,031	+121	25,000	31,381	− 20	1,000	245	+308
Kansas	80,000	78,160	+ 2	40,000	32,518	+ 23	35,000	40,130	− 13	5,000	5,511	− 9
Oklahoma	45,000	91,995	− 51	15,000	34,011	− 56	28,000	54,951	− 49	2,000	3,033	− 34
Texas	300,000	292,700	+ 2	101,500	90,300	+ 12	132,500	136,000	− 3	66,000	66,400	− 1
Montana	76,431	36,037	+112	49,615	12,742	+289	26,816	23,295	+ 15	0	0	3
Wyoming	40,800	35,356	+ 15	25,000	19,737	+ 27	13,500	13,368	+ 1	2,300	2,251	+ 2
Colorado	40,400	53,200	− 24	18,000	22,500	− 20	18,200	26,500	− 31	4,200	4,200	0
New Mexico	40,000	39,400	+ 2	22,000	18,200	+ 21	17,000	20,400	− 17	1,000	800	+ 25
WEST OF THE MISSISSIPPI	**1,109,361**	**1,054,923**	**+ 5**	**512,645**	**376,083**	**+ 36**	**474,136**	**552,959**	**− 14**	**122,580**	**125,881**	**− 3**
Idaho	30,000	29,000	+ 3	20,000	12,400	+ 61	10,000	15,600	− 36	0	1,000	−100
Utah	45,000	32,000	+ 41	31,000	13,000	+138	10,000	15,000	− 33	4,000	4,000	0
Arizona	40,000	32,836	+ 22	23,000	15,765	+ 46	16,000	16,724	− 4	1,000	347	+188
Nevada	32,000	18,293	+ 75	21,000	7,653	+174	11,000	10,640	+ 3	.....	.....	.....
Washington	78,500	67,275	+ 17	49,500	21,094	+135	22,500	37,682	− 40	6,500	8,499	− 24
Oregon	57,420	60,368	− 5	37,593	34,474	+ 9	18,977	24,458	− 22	850	1,436	− 41
California	300,000	250,910	+ 20	175,000	113,250	+ 55	100,000	118,510	− 16	25,000	19,150	+ 31
FAR WEST	**582,920**	**490,682**	**+ 19**	**357,093**	**217,636**	**+ 64**	**188,477**	**238,614**	**− 21**	**37,350**	**34,432**	**+ 8**
CONTINENTAL UNITED STATES*	**$4,693,301**	**$4,225,996**	**+10.3**	**$2,397,833**	**$1,720,305**	**+ 39**	**$1,804,407**	**$2,050,149**	**− 12**	**$491,056**	**$485,542**	**+ 1**
Hawaii	23,269	10,254	+127	0	0	.....	23,269	10,254	+127	0	0	.....
Puerto Rico	33,500	17,600	+ 90	0	0	.....	32,000	17,600	+ 82	1,500	0	.....

* 16 States and District of Columbia. (n.a.) not available.

•a State force account projects •b Includes "D" and "ER" funds •c Fiscal year ending March 1960 •d Appropriated for fiscal year ending March 1960, but more likely to be spent •e Amount paid in calendar year out of $18.4 million obligated for jobs not yet completed •f Estimated by ENR on basis of N. J. April 7, '59 press release and Jan. '59 U. S. Bureau of Public Roads report •g U. S. Bureau of Public Roads report for calendar year 1958 •h $29.9 million of this depends on appropriation of state matching funds for 1959–60 •i Includes "D" funds •j Assuming 1961 federal funds allocation available by Aug. 1, 1959 •k By contract with counties and contractors •l State reimburses counties for use of their equipment and crews •m Gravel stock piles •n Reflects ultimate construction of $96 million roads for 1959 amount; $73 million for 1958 •o Seal coats •p Fiscal year ending May 31, 1958 •q Estimated on assumption that gas tax is raised 1¢ per gal •r Five major consultants on interstate roads.

(Table continued on p. 102)

Rubber-tired dozer plugs $10 per hour profit leak

The problem was sand. 3,400,000 yds of blow sand, playing its usual havoc with crawler tracks. Particularly with push-dozer tracks. Contractors, rebuilding a federal highway in Indiana, found their 320 hp pusher, working this rough material, needed a track repair job *every 700 hours*. Cost, $7,000! Or $10 an hour—over and above normal operating costs.

When need arose for a second pusher, contractors got ready to shell out another $10 an hour.

Solution—rubber

"Before we do," said the project supt and a 29-year veteran in the business, "let's look at the latest rubber-tired dozers. Sand shouldn't be nearly as hard on rubber as it is on steel tracks."

"Agreed," management answered. "But any rubber-shod rig we buy *must* do as good a pushing job as our 320 hp crawler!"

One machine did. A 375 hp Michigan Model 380 Dozer brought in by the Clark distributor. Contractors bought it!

15 pay yds: 20 to 80 seconds

From that day on, the Michigan and the big crawler together handled push-loading of a fleet of seven 25-yd scrapers. Performance of the two pushers was very much the same. Per-scraper load time, either loading unit, varied from 20 to 80 seconds (depending upon the soil). Scraper loads, with either crawler or Michigan, measured 15-plus pay yds. Output, per pusher, with scrapers on one mile haul, ran about 2,150 pay yds per 8-hour day.

Speed provides bonus

Why was the contractor so pleased? Well, he eliminated $10 an hour in track maintenance, at no decrease in push-loading efficiency. He also got a bonus in speed. One day, for instance, the Michigan alone spread all fill . . . a job which normally took two 191 hp crawler dozers. Another time, when the pushers had to work two different borrow areas in one day, the 25 mph Michigan reached the second site so quickly it got in half an hour's work while the crawler was still creeping along the road shoulder. And the firm expects to use the Michigan on still other applications on other jobs. Says the supt, "This unit sure is *not* just a special-purpose sand machine. It can do as good a job as a crawler—or a better one—on about 70% of what some people call "big crawler" applications. Mud, not as good maybe. But sand, clay, dirt—excellent!"

High dozing speeds let the one Michigan do work of two crawlers, spreading fill.

See for yourself. Write our sales department, in Benton Harbor for data. Or call your nearest Michigan Distributor for a demonstration.

CLARK® EQUIPMENT

Michigan is a registered trademark of
Clark Equipment Company
Construction Machinery Division
2401 Pipestone Road
Benton Harbor 14, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

Buy American Deadline: July 1

It's now official.

Federal Highway Administrator Bertram D. Tallamy told the states this week that outright bans on the use of imported highway materials must stop by July 1. If states want to favor domestic goods they must comply with regulations in the Buy American Act and its amending executive order issued in 1954 (ENR Apr. 16, p. 21).

Generally, this means that domestic materials get a 6% differential over imports. It is the same preference given U.S. materials on other federally financed construction programs.

Specifically, Mr. Tallamy laid down these guide rules for states to follow in letting construction contracts where preference is given to U.S. materials:

- Bidders must be clearly informed of the restrictions and the particular materials or articles subject to the restriction.
- The restrictions may be imposed only upon a material or article that is set forth in the bid form as a bid item.
- The bidder must indicate in his bid whether he proposes to furnish a foreign article or material.
- The bid price for any such bid item of any bidder offering a material or article of foreign origin shall be required to include all costs incurred after arrival in the United States. This includes costs of delivery of the material or article to the place specified, but does not include its incorporation in the project.
- In comparing bids, the total bid price on the entire contract submitted by a bidder offering a material or article of foreign origin shall be increased by an amount equal to 6% of the bid price for such material or article.
- The contract amount shall be based upon the bid as submitted, without regard to such differential.

State bans of foreign materials on the federal-aid road program has been hotly debated within the government for months. This week's decision was triggered last summer when the Texas Highway Department asked the Bureau [illegible] it would sanction a [illegible] construction materials—primarily steel and cement. Mr. Tallamy told the state then that the bureau would not sanction the move. But he made it clear his decision was not a nationwide order.

. . . State Road Spending (continued from p. 100)

STATE AND REGION	MAINTENANCE By Own Forces 1959	By Own Forces 1958	Percent Change	By Contract 1959	By Contract 1958	Percent Change	NEW EQUIPMENT PURCHASES 1959	1958	Percent Change	CONSULTING ENGINEERING SERVICES 1959	1958	Percent Change
Maine	$12,600	$12,150	+ 4	$100	$100	0	$1,000	$1,300	− 23	$500	$600	− 17
New Hampshire	7,400	7,300	+ 1	.....	.....	.....	350	387	− 10	1,300	786	+ 65
Vermont	5,600	5,646	− 1	100	206	− 51	250	262	− 5	400	979	− 59
Massachusetts	18,875	19,500	− 3	1,350	536	+152	1,160	653	+ 78	.....	.....	.....
Rhode Island	4,000	3,381	+ 27	.....	.....	.....	208	8	+2,500	1,000	700	+ 43
Connecticut	16,500	14,000	+ 18	300	300	0	1,500	1,000	+ 50	.....	.....	.....
NEW ENGLAND	**65,275**	**61,977**	**+ 5**	**1,850**	**1,142**	**+ 62**	**4,468**	**3,610**	**+ 24**	**3,200**	**3,065**	**+ 4**
New York	38,460c	34,173	+ 13	4,702c	6,876	− 32	2,600c	1,900	+ 37	3,500d	3,788e	− 8
New Jersey	n.a.	n.a.	.....	n.a.	n.a.	.....	n.a.	n.a.	.....	n.a.	n.a.	.....
Pennsylvania	50,000	45,613p	+ 10	0	0	.....	10,000	10,293	− 3	7,000	12,000	− 42
Maryland	6,500	6,567	− 1	.....	.....	.....	720	944	− 24	2,500	3,000	− 17
District of Columbia	1,929	1,905	+ 1	828	604	+ 37	210	209	+ 0.5	1,022	2,530	− 60
Delaware	4,150	4,150	+ 7	.....	.....	.....	576	524	+ 10	750	200	+275
MIDDLE ATLANTIC	**101,339**	**92,408**	**+ 10**	**5,530**	**7,480**	**− 26**	**14,106**	**13,870**	**+ 2**	**14,772**	**21,518**	**− 31**
Virginia	24,600	25,402	− 3	4,000	5,317	− 25	900	1,800	− 50	1,725	2,818	− 39
West Virginia	1,000	18,950	− 95	5,000	6,750	− 26	2,000	1,873	+ 7	1,000r	1,392r	− 28
North Carolina	47,500	45,400	+ 5	2,500	2,800	− 11	3,300	3,500	− 6	45	125	− 64
South Carolina	12,600	12,600	0	0	0	.....	1,400	1,200	+ 17	0	47	−100
Georgia	11,000	10,917	+ 1	0	0	.....	1,000	1,185	− 16	.....	.....	.....
Florida	13,000	12,500	+ 4	5,000	4,800	+ 4	1,500	1,101	+ 36	1,700	3,400	− 50
Alabama	6,500	6,398	+ 2	500	150	+233	500	417	+ 20	.....	.....	.....
Mississippi	6,000	5,720	+ 5	0	0	.....	400	150	+167	75	22	+241
Louisiana	20,000	19,349	+ 3	750	650	+ 15	1,820	1,813	0	4,000	3,864	+ 4
Kentucky	27,000	23,000	+ 17	4,000	3,500	+ 14	3,000	3,000	0	n.a.	n.a.	.....
Tennessee	14,600	14,600	0	0	0	.....	1,000	1,000	0	4,000	4,000	0
SOUTH	**183,800**	**194,836**	**− 6**	**21,750**	**23,967**	**− 9**	**16,820**	**17,039**	**− 1**	**12,545**	**15,668**	**− 20**
Ohio	29,250	30,276	− 3	1,500	1,640	− 9	1,250	2,376d	− 47	2,600	6,200	− 58
Indiana	19,703	18,751	+ 5	375	353	+ 6	4,800	4,300	+ 12	5,800	5,200	+ 12
Illinois	29,000	23,900	+ 21	2,000	3,200	− 37	2,700	1,700	+ 59	5,600	5,700	− 2
Wisconsin	0	0	.....	14,500k	13,600	+ 7	 l	 l	.....	2,000	2,400	− 17
Michigan	4,100	3,995	+ 3	14,500	14,600	− 1	1,340	839	+ 60	2,000	3,000	− 33
MIDDLE WEST	**82,053**	**76,922**	**+ 7**	**32,875**	**33,393**	**− 2**	**10,090**	**9,215**	**+ 9**	**18,000**	**22,500**	**− 20**
Minnesota	14,000	13,292	+ 5	2,000	2,730	− 27	2,200	1,718	+ 28	2,000	1,915	+ 4
Iowa	10,500	9,550	+ 10	1,400	1,243	+ 13	1,500	902	+ 66	2,400	2,500	− 4
Missouri	22,950	21,373	+ 7	2,900	2,700	+ 7	1,700	1,479	+ 15	800	1,344	− 40
Arkansas	n.a.	n.a.	.....	n.a.	n.a.	.....	n.a.	n.a.	.....	n.a.	n.a.	.....
North Dakota	4,802	3,269	+ 47	900	490	+ 84	390	345	+ 13	55	45	+ 22
South Dakota	4,200	4,180	+ 0.5	1,540	620	+148	535	450	+ 19	305	170	+ 79
Nebraska	7,500	7,408	+ 1	1,000	1,244	− 20	750	754	− 1	250	298	− 16
Kansas	12,200	11,995	+ 2	2,500	2,315	+ 8	1,108	1,159	− 4	750	1,063	− 29
Oklahoma	3,850	3,885	− 1	100	108	− 7	2,000	382	+424	720	2,024	− 64
Texas	42,666	39,588	+ 8	0	0	.....	5,500	5,000	+ 10	195	195	0
Montana	6,900	6,797	+ 2	500m	300m	+ 67	500	300	+ 67	0	0	.....
Wyoming	4,000	4,000	0	0	0	.....	500	500	0	5	85	− 94
Colorado	7,638	7,106	+ 7	620	621	− 0.2	1,000	900	+ 11	396	230	+ 72
New Mexico	9,500	8,000	+ 19	500	900	− 44	750	600	+ 25	600	600	0
WEST OF THE MISSISSIPPI	**150,606**	**140,441**	**+ 7**	**13,960**	**13,271**	**+ 5**	**18,433**	**14,489**	**+ 27**	**8,476**	**10,469**	**− 19**
Idaho	6,000	5,650	+ 6	100	244	− 59	300	300	0	100	300	− 67
Utah	4,800	4,600	+ 4	0	0	.....	1,200	1,000	+ 20	1,800n	1,300n	+ 38
Arizona	4,500	4,299	+ 5	1,000o	300o	+233	500	187	+ 3	1,800	0	.....
Nevada	3,500	3,000	+ 17	0	0	.....	750	750	0	600	400	+ 50
Washington	9,000	9,000	0	1,500	1,500	0	1,350	1,350	0	0	0	.....
Oregon	12,600	12,493	+ 1	300	248	+ 21	1,693	1,701	− 1	0	0	.....
California	35,000	32,650	+ 7	800	690	+ 16	3,500	4,690	− 25	0	0	.....
FAR WEST	**75,400**	**71,692**	**+ 5**	**3,700**	**2,982**	**+ 24**	**9,293**	**10,278**	**− 10**	**4,300**	**2,000**	**+115**
CONTINENTAL UNITED STATES	**$658,573**	**$638,278**	**+ 3**	**$79,655**	**$82,235**	**− 3**	**$73,210**	**$68,501**	**+ 7**	**$61,293**	**$75,220**	**− 18**
Hawaii	1,526	1,356	+ 13	224	62	+261	30	22	+ 36	0	7	−100
Puerto Rico	4,300	4,200	+ 2	0	0	.....	200	150	+ 33	500	100	+400

"New" handyman for home-builders

Unusual uses of Michigan Tractor Shovels reduces costs for Montana contractor on wide variety of tasks . . . including digging basements

On the Riverview Terrace housing project in Great Falls, Montana—where William N. Kessner, Inc. is building 150 $15O,000 homes per year—a pair of Michigan Tractor Shovels has reduced costs of virtually every material handling operation!

Their versatility has prompted company officials to term the two rigs "as necessary to the home-builder as 2 x 4's."

Yet, not so long ago, Kessner's original Michigan—a Model 75A with two-yard bucket—was used *exclusively* for loading spoil into haul trucks. But the machine soon showed it had free time. So it began cleaning spillage off driveways and sidewalks, too. Then Kessner put it to work backfilling around foundations and service lines. Then clearing brush and debris. *Then digging the basements!* (Rig worked so well here, this unusual rubber-tired task has become a Michigan "specialty." Typical basement, 24 x 30 ft by 6 ft deep, through sandy clay and gumbo, takes about three hours to dig and trim.)

The second Michigan, another 80 hp Model 75A, is equipped with a set of forks and assigned primarily to handling the building supplies. It too has produced a major time-saving. Instead of fabricating on the job, carpenters now nail together large wall sections of each home under the ideal working conditions of the shop. Each completed section—loaded by the Michigan fork lift—is trucked to the appropriate site; then unloaded, lifted and held by the Michigan for precision placement on the foundation. For the average house, the four "prefab" walls can thus be set in ½ hour! The saving? Literally days over customary erect-in-place methods.

There are dozens of time-saving construction uses like these for Michigan Tractor Shovels and their many buckets and attachments (including crane hooks, back hoes, sweepers, backfiller blades, scarifiers). Make a list of material-handling chores you'd like to speed (or make more economical) . . . then ask your Michigan Distributor for a demonstration of each. Judge for yourself. We think you'll like what you see.

Wall section, prefabbed at shop, is steadied in vertical position by Michigan for precision spotting on concrete foundation.

Fork-equipped Michigan Model 75A picks 2,000 board feet off haul truck, delivers it to contractor's carpentry shop.

Michigan is a registered trademark of
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Construction Machinery Division

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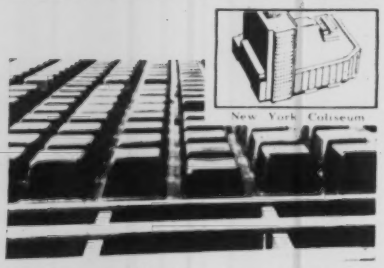
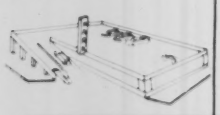
GRID SYSTEM CONSTRUCTION USES CONCRETE TO

MAXIMUM ADVANTAGE!

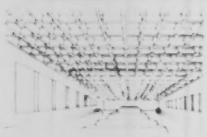


New York Coliseum

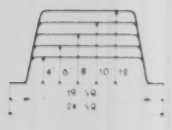
Specifiers of reinforced concrete construction find GRID SYSTEM highly effective and versatile, for heavy-duty floors and ceilings. Economical GRID SYSTEM construction permits maximum column-free spans, by removing dead-load concrete. Use of removable interchangeable GRID domes offers great flexibility in layout of utilities. GRID SYSTEM construction carries maximum loads, approaches 100% concrete efficiency in thousands of buildings across the country.*



GRID SYSTEM construction turns roof space into a profitable area at no extra cost, allows future floor or penthouse additions.



GRID SYSTEM permits large column-free areas. Coffered ceiling diffuses sound, produces good acoustic value. Modular, contemporary appearance.



Interchangeable GRID domes are delivered on short notice in quantities large enough for any project. Standard sizes are shown. Other sizes for special jobs available.

*New York Coliseum, New York City; Boston Globe Building, Boston, Mass.; Boston Herald-Traveler Building, Boston, Mass.; Gertz Store, Hicksville, L.I., New York; IBM Building (Two wing additions), Poughkeepsie, New York; B. Gimbel's 69th Street Store, Philadelphia, Pennsylvania, and many other well-known buildings.

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Industrial Park Plans Stalled

Kentucky is encountering some obstacles in its attempts to obtain new industry.

Statewide plans will be delayed while the state's Industrial Development Finance Authority prepares a legal test of its statutory powers to lend state funds to small cities for industrial expansion.

And in Louisville, hopes for an industrial park are snagged on economic realities. A privately sponsored survey shows land development costs in the area are too high. The report specifically cites water and sewer installation costs as the big stumbling block.

The 1958 legislature, in creating the IDFA, gave it authority to lend state funds for two purposes.

It can loan a small town up to 30% of its total needs to provide physical facilities for a specific industry. Or the agency can lend up to 50% of a town's total needs to develop a site for industry in general. In both cases, communities must show the need for financial aid.

To test its powers, the Industrial Authority plans to find a small community hoping to obtain new industry, but without sufficient funds to provide the needed facilities. The authority also will locate an industry willing to settle in the test community.

When the community and a specific company are brought together, the 30% loan will be provided from the governor's emergency fund. If the court rules in favor of the IDFA, the agency will ask the 1960 legislature to establish a $1.5-million revolving loan fund.

Louisville's problem is different. The local Chamber of Commerce says, "Industrial park sites could easily exceed $11,000 per acre." This would be too high to compete with other cities because industries are generally unwilling to pay more than $7,000 an acre for developed land, says the Chamber.

The chamber says the cost of water and sewer service are primary stumbling blocks to developing the proposed park.

The study was made to determine costs of developing a 323-acre industrial park in the area. Estimated costs for land and improvements were $9,914 an acre. Of the per acre cost, 56% was attributed to water and sewer services. Design, promotion and brokerage fees boosted cost to $11,000 an acre.

Business in Brief . . .

• **DuPont is big spender**—DuPont de Nemours & Co., Wilmington, Del., will spend about $180 million for construction this year, compared to $230 million in 1958. DuPont does all of its own construction work. The decline reflects the business slowdown in 1958; there's a one-year lag between authorization and expenditures.

• **Housing surprise**—Deadlock over the housing bill in the House Rules Committee has industry people baffled. A tie vote blocked the bill, with Chairman Howard Smith (D., Va.) lining up on opposition side. Best lining up on opposition side.

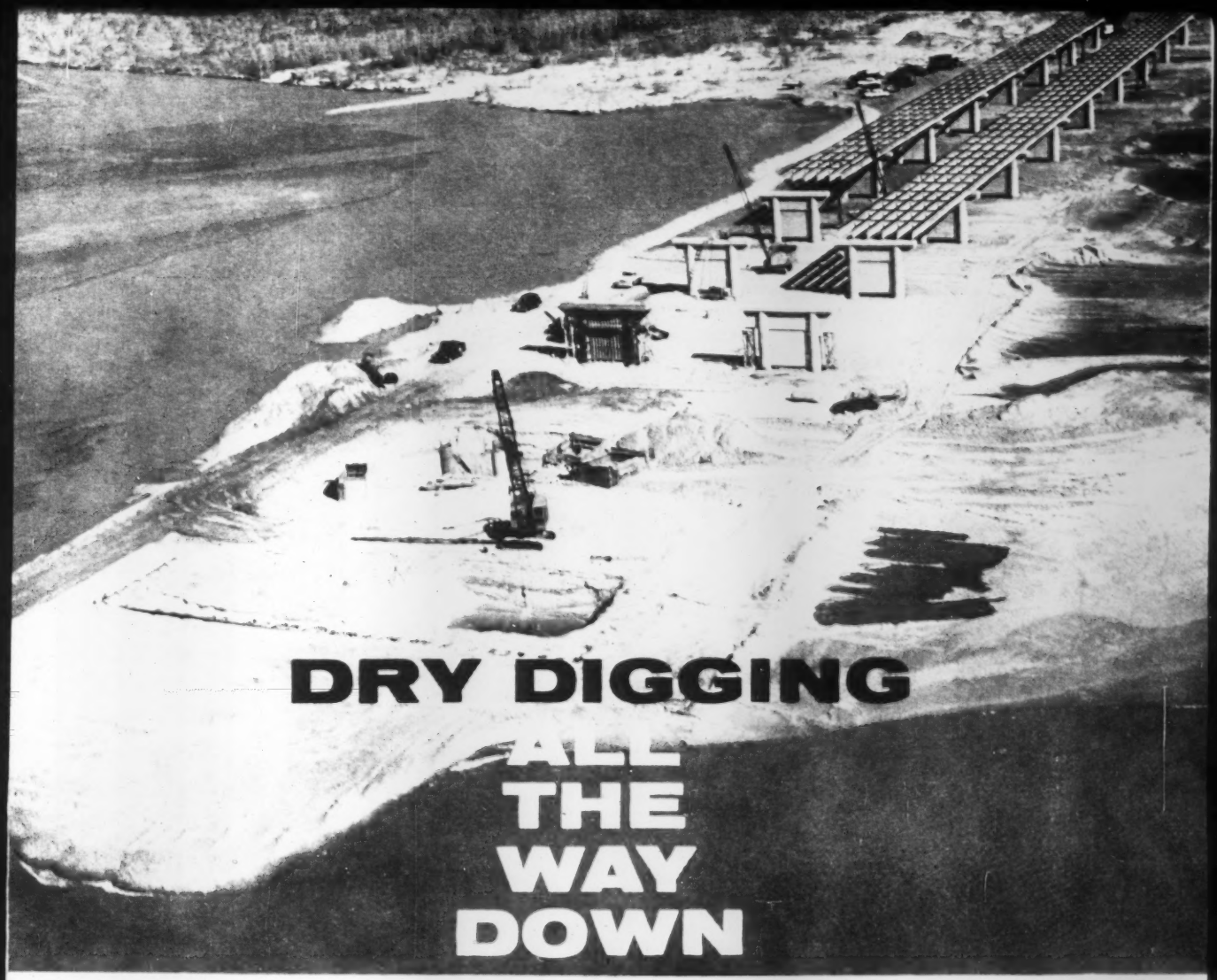
• **New city in new state**—A $350-million resort and residential city is planned for Hawaii by industrialist Henry J. Kaiser, Los Angeles homebuilder Fritz Burns and Los Angeles architect Welton Becket. Hawaii-Kai will cover 6,000 acres, from undeveloped Koko Head, around Maunalua Bay to Makapuu Point. Plans include hotels, luxury housing, a marina and service facilities.

• **School aid chances dim**—Federal aid to school construction has little chance of going anywhere at this session despite approval by a House education subcommittee of a bill to authorize a four-year, $4.4-billion grant program to the states for new classrooms and teachers' salaries.

• **Consultants want more money**—The National Society of Professional Engineers asked Congressional Appropriations Committee chairmen to raise to $100 per day the maximum rates paid temporary consultants for the federal government. Present pay: $50 to $75 per day.

• **Detroit medical center**—Detroit will replace a downtown slum area with a $100-million medical center on a 32-acre site.

• **Rochester looks ahead**—The City Planning Commission of Rochester, N. Y., has approved construction plans totaling $44.7 million for the next decade. It also recommended capital spending of $15.3 million for the fiscal year beginning July 1.



Contractor: Duard Pyle, Oklahoma City, Oklahoma

STANG SINGLE STAGE WELLPOINT SYSTEM SPEEDS EXCAVATION THROUGH COMPLETE GROUND WATER CONTROL

Excavating for these riverbed bridge piers required efficient, accurate water control. The method chosen to accomplish this had to be sufficiently effective to dewater 24' to subgrade, yet flexible enough to move on to the next landing as the piers were placed. At the request of the contractor, engineers of the John W. Stang Corporation analyzed the problem and promptly recommended wellpointing as the best solution. Why a wellpoint system? Because it afforded pinpoint accuracy in the area being dewatered, it did not inhibit the excavating with shoring, braces or equipment in the hole, and it was economical and reliable to operate.

The successful handling of difficult water problems is Stang's sole business. Stang engineers are water-handling specialists, well-qualified to prescribe the most efficient and economical solution to job site water problems of all types. The next time you have a water problem, consult the Stang office nearest you. You'll save time and money when you do.

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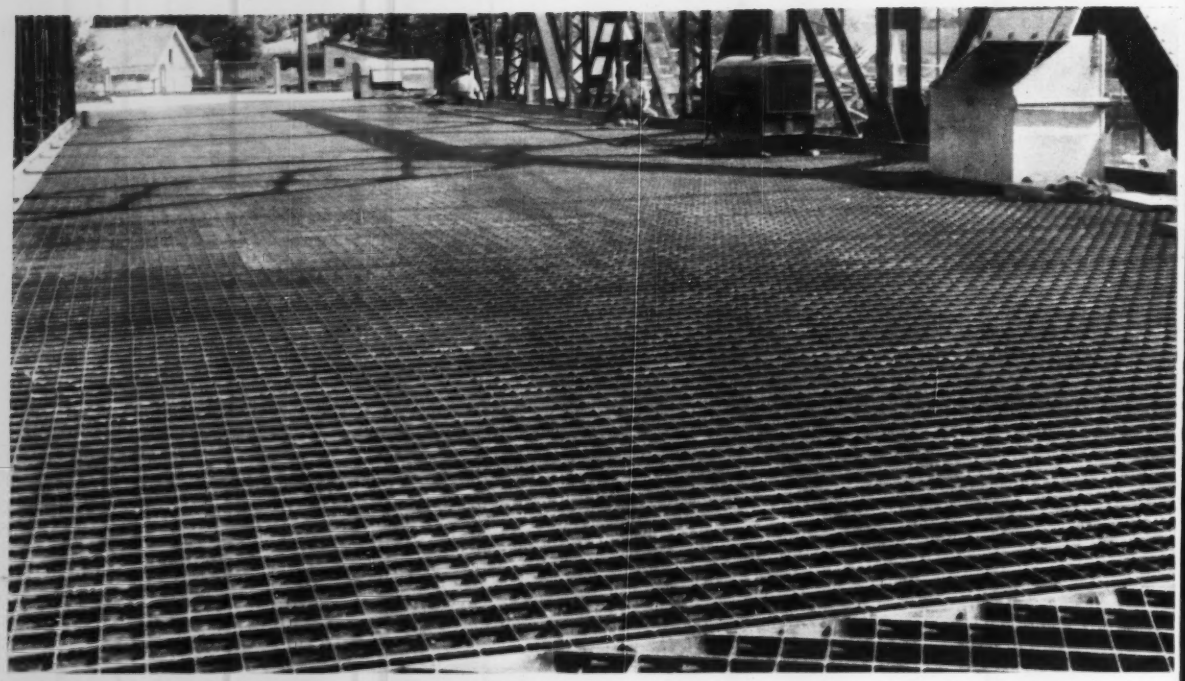

Carbondale, Pa. Bridge. High Welding Company, contractor. William P. Ross, job superintendent. This bridge has three approaches of various lengths and grades, and one 125' main span. 4,900 sq. ft. of 4¼" I-Beam-Lok (with ¾" overfill) was laid on the main span, with 18,725 sq. ft. of 5" open-type I-Beam-Lok placed on the three approach spans. Also, 1,000 sq. ft. of Tee-Type Sidewalk Flooring.

The old flooring on the 24' roadway was made up of a layer of asphalt on 4" brick, over a series of concrete arches between stringers varying in depth from 6" at top of arch to 21" at the stringer. While no accurate weight estimate was made of the complicated floor system, Mr. Ross figured that at most, the new open I-Beam-Lok steel floor weighed but 15% of the obsolete floor it replaced. *In other words, I-Beam-Lok reduced deadweight of approaches approximately 85%.*

In discussing this project, superintendent Ross said that in addition to the usual I-Beam-Lok advantages to contractors (speed of installation, ease of handling, and made-to-order working platform), the use of this lightweight steel flooring eliminated the necessity of working from below the bridge where both railroad tracks and power lines would have been encountered. Conventional construction would have required *two time-and-labor consuming operations—the placing of forms and then stripping them after pouring*—while I-Beam-Lok allowed all work to be performed top-side.

Superintendents on
of reflooring

When you want information about a product, g
out and talk to the men on an actual job. The
deal with facts, not theory. They'll tell you exactl
how it handles; whether it does what it is suppose
to do; whether it solves problems, or causes then
That's why we visited the two reflooring jobs show
here. Both project superintendents are experts o
reflooring old bridges. Incidentally, the men ar
brothers, and have been employed by the sam
contractor, High Welding Company, of Lancaste
Pa. for more than 20 years.

USS and I-Beam-Lok are registered trademar

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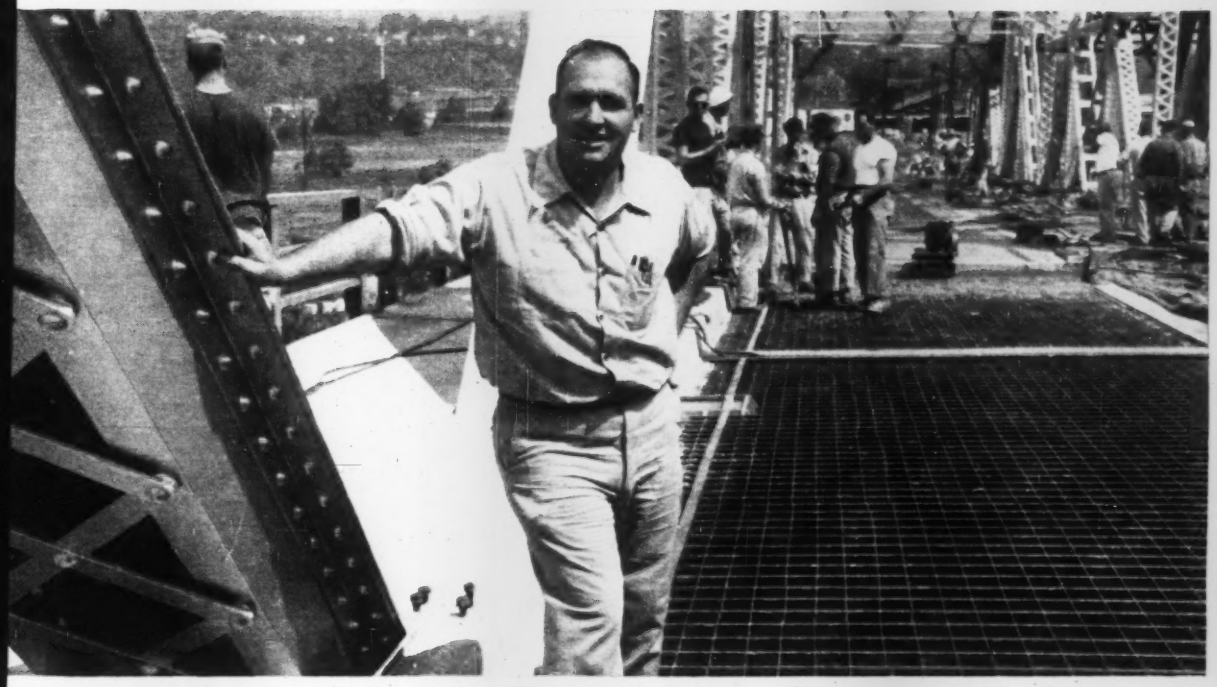
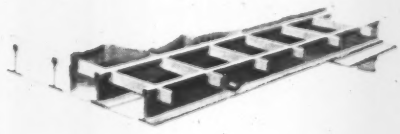


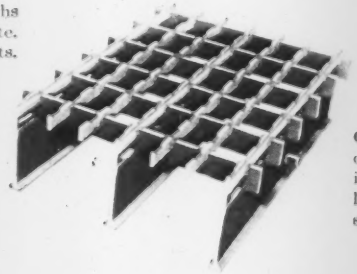
different jobs point out extra advantages old bridges with USS AmBridge I-Beam-Lok

Mulberry Street Bridge, Scranton, Pa. High Welding Company, contractor. Lester D. Ross, superintendent. This project involved reflooring an old bridge which carried two 23'6" roadways, 610' long, plus two 6' sidewalks. One of the roadways carried abandoned street car tracks; the other was paved with layers of asphalt, binder, and concrete piled to a thickness of 6 inches atop ⅜" steel buckle plates. All of which, together with the old tracks, had to be removed and replaced with 4¼" concrete-filled type I-Beam-Lok. (Some new beams and stringers were erected on both roadways.) A total of 31,000 sq. ft. of 4¼" concrete-filled type I-Beam-Lok was used for the roadway, plus 10,500 sq. ft. of 2" USS Tee-Type Sidewalk Flooring. (The roadway received a ¾" overfill.)

Commenting on this job, Lester Ross states that, in addition to the regular weight savings, speed of erection and ease of handling, another advantage was that the I-Beam-Lok was specially shaped with a 4" camber to fit existing beams, thus eliminating additional deadweight and framing problems.

Concrete-filled I-Beam-Lok. In 3" and 4¼" depths. Weighs 47 lbs. psf. and 61 lbs. psf. respectively including concrete. If ¾" over-fill is used, add 9 lbs. psf. to above weights.





Open-type USS I-Beam-Lok. 5" depth. Weighs 18.8 psf. Available in units 6'2" wide and up to 48' long. Can be applied directly to stringers.

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Canal Plan Fades

Seaway from New Orleans to Gulf is unpopular

Public opposition has apparently killed a proposal to build a seaway from New Orleans to Grand Isle in the Gulf of Mexico.

The project's estimated cost was $130 million. Of the total, $93 million would have gone to construction of a 55-mile deep-water channel, highways, bridges and terminal facilities. Financial charges, engineering and other non construction items would have cost another $37 million.

Planning for the seaway began during the early 1940s. It wasn't until 1955, however, that solid efforts were placed behind the project. Then, Associated Tidewater Engineers of New Orleans were retained by Jefferson Parish to conduct preliminary investigation of the proposal. The firm is composed of Eay, Spofford and Thorndike of Boston, and T. Edward Ernst of New Orleans.

In 1956 the Jefferson Seaway Commission was created to administer the project. The commission called for a taxpayers' election on March 3, 1959, to get authorization for a $135-million revenue bond issue.

Voter approval, said the commission, would give the commission authority to obtain a detailed feasibility survey.

But attempts by the Seaway Commission to bring the bond issue to a vote aroused public opposition. The commission therefore postponed the bond election twice, the second time indefinitely.

June Start Scheduled For Second Sumner Tube

Construction of a second vehicular tunnel under Boston Harbor—connecting East Boston with Boston—will start in about two months, estimates the Massachusetts Turnpike Authority.

MTA sold $52.8 million in bonds to purchase and modernize 25-year-old Sumner Tunnel and to build the new tunnel, which will parallel the existing tube (ENR Oct. 30, 1958, p. 76). A construction contract of $29 million for the new tunnel is held by Perini Corp., Framingham, Mass.

The new tube, a three-year construction job, will have one lane in either direction. It will tie in with the Massachusetts Turnpike and the New Hampshire Turnpike over a relocated Route 1).

Consulting engineers are Singstad & Baillie of New York City.

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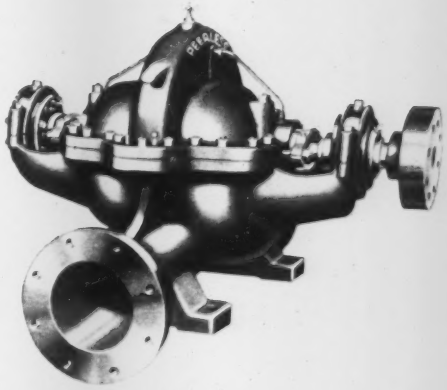

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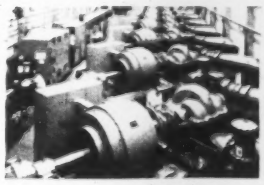

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47 Tons of Roebling Guys Keep TV Tower in Clear View of 2,464,500 People

The grand, new (1526 ft) WIS-TV transmitting tower in Columbia, South Carolina is, among other things, the fourth tallest man-made structure in the world, with a built-in wind resistance up to 145 miles per hour. This ethereal eminence means an increase of almost 100% in the number of WIS-TV's potential viewers.

Maintaining the tower's sway (both literally and figuratively) over the South Carolina market are six sets of Roebling prestretched galvanized bridge strand. Each set consists of varying lengths of prestretched strand: six pieces of 1-5/16" strand at lengths ranging from 705 to 1022 ft, three pieces of 1-3/16" strand of 826, 837 and 858 ft, respectively, three pieces of 1¼" strand in lengths of 1489, 1492 and 1473 ft and six pieces of 1½" diameter from 1662 ft to 1835 ft.

The sky-high demands, these days, made by TV stations require the facilities and experience of a "feet on the ground" organization like John A. Roebling's Sons Corporation. When you are contemplating a third (or even first) highest man-made structure in the world, you will need guys to keep it eminently erect. That is the time to call on Roebling and enlist the aid and facilities of the authority on suspension systems in this, or any other country. This includes bridges, tramways, ski lifts, materials handling, suspended roofs and, as you already know, new heights in market power.

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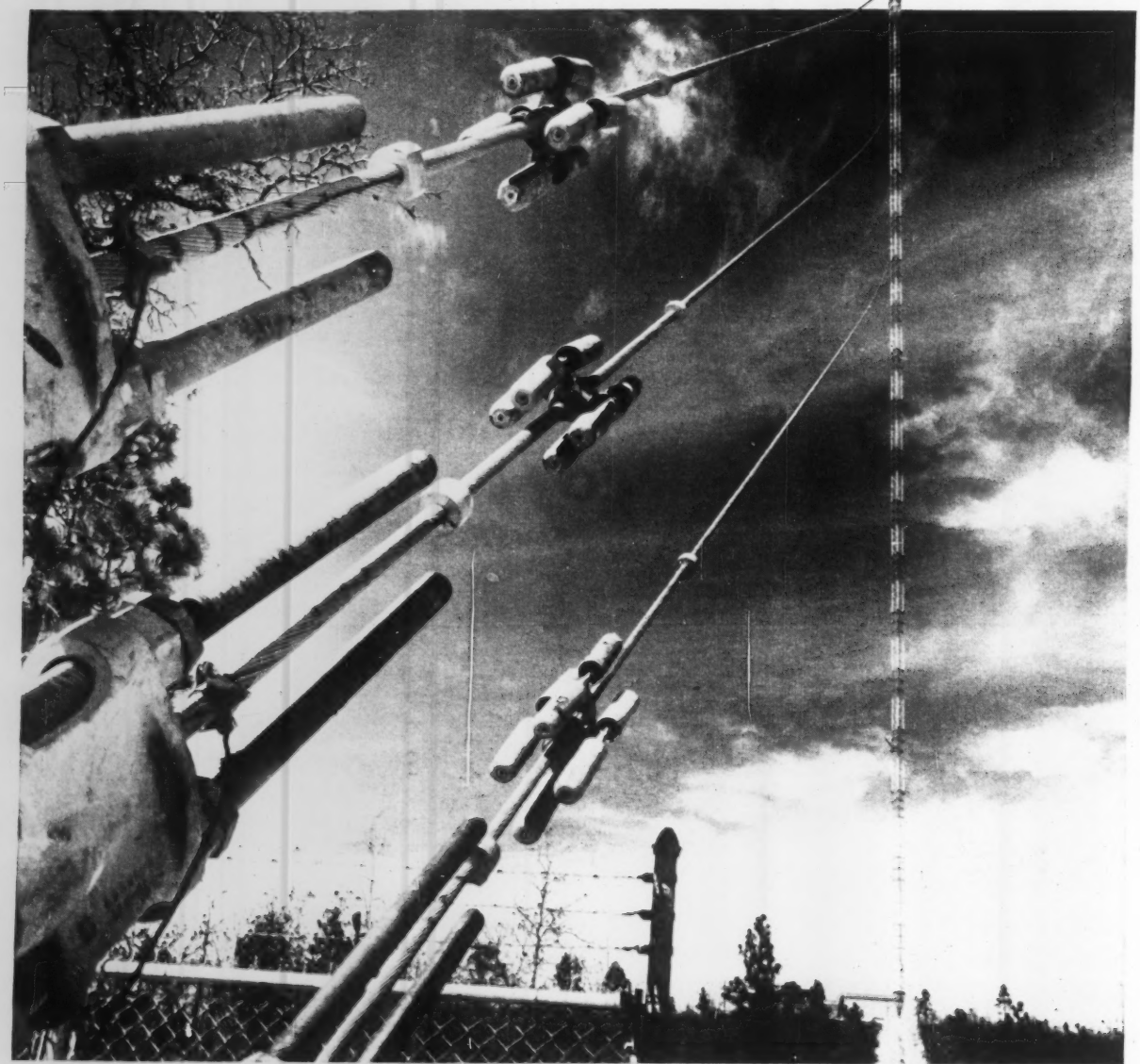

¹WIS-TV Tower in Columbia, South Carolina, 1526 feet tall, designed, fabricated and erected by Kline Iron & Steel Company, Columbia, South Carolina.

New Contracts Follow Old Pattern

Settlements continue to boost labor costs. Chicago employers call 25-cent raises "disconcerting."

Wage hikes for construction workers keep coming—adding 10 cents, 15 cents and even 25 cents an hour to direct labor costs.

Bulk of the new hourly wage increases fall within the 10- to 15-cent range.

Employers in Chicago, where one trade has just signed for 25 cents an hour more, consider the result "disconcerting." But construction costs, they say, need not necessarily increase as a result. That depends, they explain, on how much labor does to increase its productivity.

• **Chicago**—The Chicago settlements, which are the first ones concluded in the area this season, are with locals of the bricklayers, asbestos workers and lathers unions. All the contracts are for one-year terms, although two of the crafts formerly had two-year contracts. Fringe benefits were improved in one case only.

Here are the results:

• Bricklayers up 25 cents to $4.07½ an hour. They'll continue to get 7½ cents an hour for health and welfare.

• Lathers up 12½ cents an hour to $3.85.

• Asbestos workers, who won a 21-cent package, up 5 cents an hour in basic wage to $3.80. They get a five-cent increase in pension contributions and will receive six paid holidays they haven't had before.

A spokesman for the Building Construction Employers Association, commenting on the increases, said: "We hoped any increases justified would be kept at a minimum. The increases are a maximum. It had been our hope that only the trades that received no increase in 1958 would be granted adjustments this year. If the workers can give us a full day's work for a full day's pay without early quitting, coffee breaks, etc., it could be that these raises won't increase costs at all. But if productivity remains at its present level, naturally building costs will go up."

• **Tulsa**—In Tulsa carpenters have won 27½ cents from the Associated General Contractors in a two-year contract. They will receive a 12½-cent increase June 1 (new scale will be $3.30), 10 cents more June 1, 1960 and another five cents the following January.

• **Springfield**—New long-term contracts have been signed by bricklayers and lathers in Springfield, Mass.

Bricklayers have settled for 22½ cents in a two-year contract—15 cents now and 7½ cents next January. They will continue to get a 3% health and welfare contribution. New scale is $3.40½.

The lathers took a three-year contract calling for three annual increases of 10 cents each and a five-cent increase in health and welfare. With the first wage boost, their scale became $3.40.

• **Spokane**—A considerably large increase—50 cents spread over three years—has been won by some 4,000 carpenters employed by AGC members in eastern Washington and northern Idaho.

The first wage increase—19 cents an hour retroactive to February 15—brings the new scale for journeymen to $3.32. Two deferred increases of 15 cents each will become effective in February of 1960 and 1961.

Foreman's premium pay was upped by 12½ cents an hour to 37½ cents. A 10-cent health and welfare contribution was carried over. And travel allowances in two zones were increased by 50 cents a day, while a new zone (beyond 65 miles) was set up with a $6 daily allowance.

• **Montana**—Meanwhile, another new AGC contract drops the travel allowance clause completely. This action is more in line with the industry's "Ten Commandments," which seeks to discourage "excessive" travel allowances, among other things.

The contract is with the laborers' state-wide District Council and calls for a 39-cent wage increase spread over three years. The first wage boost is 12 cents and the deferred increases are 12 and 15 cents.

• **Oklahoma City**—Larger increases have been obtained from the AGC by some 1,500 laborers in the Oklahoma City and Norman areas.

The union has agreed to a two-year contract that provides for a 30-cent wage boost in two installments—15 cents now and 15 cents next year.

• **Denver**—One of the smallest increases in the current batch goes to members of cement mason Local 528 under a state-wide contract.

Associated Building Contractors of Colorado has signed a two-year contract with the union. The pact calls for a 10-cent wage boost now and another 10 cents next April 1.

How Industry, Labor Aid Students

Both union and employer groups are pushing scholarship programs.

On the union side, the AFL-CIO is currently investing more than half a million dollars a year in college scholarships. An employer group, the National Association of Plumbing Contractors, offers scholarships to train plumbers and mechanical engineers.

The AFL-CIO and its affiliates spend over $539,000 annually on college scholarships, according to a recent survey by the AFL-CIO Department of Education. Latest in the list of AFL-CIO grants are six $6,000, four-year merit scholarships—two scholarships in each of three geographical regions.

In each region, one scholarship will be given to the child of an AFL-CIO member and the other will be unrestricted. Each grant will cover four years of study and will go to a student entering college in September, 1960.

Scholarship winners, who will be picked on the basis of competitive examinations, may follow any course of study at any accredited college or university. Each winner will receive up to $1,500 per year.

Twenty-six applicants are seeking two scholarships offered by the NAPC. One scholarship pays $800 annually toward a four-year course in mechanical engineering. The other is a two-year scholarship for a trade school course in plumbing and related skills; it also pays $800 per year.

Scholarship winners, limited to sons of NAPC members, must pledge to remain within the contracting branch of the plumbing and heating industry at least four of the eight years after their graduation.

(*Labor continued on page 112*)

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Labor in Brief . . .

• **Labor on Federal Reserve Board?**—A bill to give labor, small business and consumers representation on the Federal Reserve Board has been introduced in the Senate. Supporters, including the AFL-CIO, point out that FRB policies affect all citizens, not just finance and industry. Opponents may argue that passage of the bill would make intricate monetary decisions subject to pressure groups and popular opinion.

• **Sharing productivity gains**—An unusual proposal for giving union members a share of savings gained by mechanization has been advanced by West Coast longshoremen. ILWU suggests its members be paid straight time wages for man-hours saved. It says employers would still keep profits from less overtime, lower fringe benefit costs, faster turnaround.

• **Right-to-work defeat**—The Vermont House of Representatives has overwhelmingly killed a right-to-work proposal to outlaw the union shop.

• **More fringe benefits?**—Greater union emphasis on expansion of worker insurance and family insurance was predicted last week by AFL-CIO President George Meany. He said this would be attained—largely through collective bargaining—as a deferred wage increase.

• **Apprentice contest**—The Bricklayers, Masons and Plasterers' International Union will hold its annual apprenticeship contest in San Francisco from May 1-6. The competition will be limited to 80 apprentices, chosen from subordinate unions in all states. Contest is aimed at focusing national attention on apprentice training.

• **Community teamwork**—Contractors and all the local unions in Cambridge, Ohio, will participate Saturday in donating labor and equipment to widen two blocks of a city street for extra parking space. The operation requires removal of some 2,543 cu yd of soil.

Davis-Bacon Change Opposed

A West Coast employers' association is against a pending proposal to extend prevailing wage protection to architects, technical engineers, draftsmen and technicians.

The Engineering Consultants and Architects Committee of the Los Angeles Chamber of Commerce contends that "a large number of architectural and engineering firms . . . across the country . . . would adversely be affected by adoption" of such a law.

The proposal is contained in two bills (H. R. 4369 and S. 1119) now before Congress to modernize the Davis-Bacon Act. It calls for the payment of "salaries prevailing in the locality, as determined . . . by the Secretary of Labor" to "all architects, technical engineers, draftsmen and technicians" employed on federal or federally assisted construction projects costing more than stated amounts.

The committee says "the people proposed to be brought under the provisions of the act, aside from laborers and mechanics, are professional people whose wages vary greatly depending on the professional skills of the individual." Their inclusion, it adds, would be "detrimental" to many and, in some cases, would add to building costs.

Contract Can't Legalize Boycott

Is a labor contract clause that makes the contract binding on subcontractors any good?

The courts have not answered the question yet. But the National Labor Relations Board again says contractor violation of the clause does not justify or excuse a secondary boycott.

In the case before the board, a union contractor hired a nonunion subcontractor to work on a Dow Air Force Base project in Maine. Two unions affiliated with the Bangor Building Trades Council protested and said the subcontract clause in their labor contract was being violated. Later, the unions struck.

The unions contended they were trying to enforce the subcontract clause and to get union working standards observed throughout the project.

The NLRB held that at least one of the objects of the strike was to force the general contractor to cease doing business with the nonunion subcontractor. Result, it said, was an illegal secondary boycott, which existence of the subcontract clause did not cure.

Progress Payments

Contractor may stop work if not paid for progress.

Construction contracts usually provide for monthly, or work progress, payments so the contractor has enough money to pay for materials and labor as work progresses. Failure to meet these payments is a breach of contract and justifies the contractor abandoning the work.

The contractor has two possible remedies: he may rescind the contract and seek to recover the fair and reasonable value of the work performed, or he may claim the contract value of the work performed and the profit lost by non-completion of the work because of the owner's breach of contract.

The following court decisions sustain this legal principle:

In a recent Massachusetts case[1], the contractor stopped work when the owner failed to make the monthly payment. Upon suing, the contractor was granted the fair and reasonable value of the work performed.

The court ruled: "The (owner) having defaulted in payment without justifiable cause, the (contractor) was warranted in refusing to continue the work . . ., and may maintain an action to recover the fair value of the work done and materials supplied. . . ."

In a Maryland case[2], the court stated: "Failure to pay an installment due on a building contract is generally held to be such a material breach as to excuse further performance by the builder. . . . This may be true even if the contract were divisible. . . . Among other remedies that a builder may pursue is the remedy of a suit for damages for a total breach, which would ordinarily be the unpaid contract price less the reasonable cost of completion of the work unperformed. . . ."

In a Federal Court case[3], the court held that the failure to make the monthly payments is a breach of the contract.

The court held that in a building or construction contract . . . calling for the performance of labor and furnishing of materials covering a long period of time and involving large expenditures, a stipulation for payments on account to be made from time to time during progress of the work is so material that a substantial failure to pay would justify the contractor in stopping work.

(1) Beaudoin v. Lenza, 136 N.E. 2d, 1682, Supreme Court of Massachusetts, March 6, 1959.

(2) Shapiro Engineering Corp. v. Fran-

NEW MIDGET VIBRATOR

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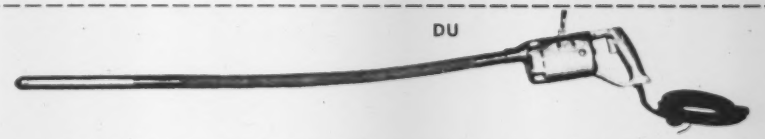
7/8", 1 1/4", 1 5/8", and 2" HEADS

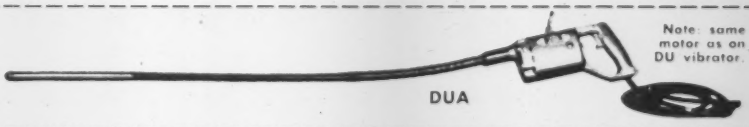
Stow Manufacturing Company has just put on the market a rugged yet small electric vibrator that is extremely versatile. The model DU vibrator is available with either a 1 1/4" or 7/8" vibrator head and with various lengths flexible shafts from 2 ft. to 21 ft. long. These small vibrator heads really pack a wallop and are driven by a lightweight 3/4 HP universal motor at 12,000 vibrations per minute.

The STOW DU Midget vibrator is shown here vibrating 1 1/2 inch slump concrete tongue beams. Because of the small vibrator heads, the DU is ideal for jobs with narrow forms, such as precast work, vaults and manholes and on jobs where the reinforcement is closely spaced. It is also extremely useful for small jobs such as sidewalks, cellar floors, patios and swimming pools.

The DU vibrator may also be obtained with 1 5/8" or 2" vibrator heads. ALL STOW vibrator heads have duplex ball bearings at each end supporting the eccentric weight and are sealed to retain the oil lubricant for life.

The 3/4 HP universal motor weighs only 9 lbs., has a trigger switch in the handle, and features thermal overload protection.





Note: same motor as on DU vibrator.

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cis O. Day Co., 137 A. 2d 695.
(3) Northeast Clackamas County Electric Co-Operative, Inc. v. Continental Casualty Co., 221 F. 2d 329.

Payment Bond Recovery Depends on Local Statute

A subcontractor may start action against the surety of a prime contractor after the period allowed by statute, if final settlement has been made between the prime contractor and the awarding authority, at least in Illinois.

In an Illinois case, Jacobson Bros. Co. contracted with a Board of Education to build a public high school. In accordance with local statutes, Jacobson furnished a payment bond to ensure prompt payment by him to all persons supplying labor and materials.

Subsequently, Jacobson subcontracted the excavation work to Samuel S. Palumbo. Jacobson later went bankrupt, still owing Palumbo $5,332. Palumbo brought action against Jacobson and his surety to recover the money owed him.

The trial court dismissed the action. It ruled that, by local statute, no person with a claim for labor or material has the right of action unless he has filed a verified notice of his claim with the awarding authority within a specified time after the last item of work is done or the last item of material is supplied. In this case, said the court, the subcontractor failed to do this.

The appellate court reversed this decision. It held that while the statute required an action to be started within a specified time, it also provided that where a final settlement is made between the awarding authority and the general contractor, an action may be started after that settlement.

The appellate court stated that the statute requiring contractors to furnish a payment bond on public works projects is meant as a remedy. It is intended to protect subcontractors and material suppliers who have no right of mechanic's lien, said the court. Therefore, it should be construed liberally in order not to inflict a hardship.
(1) Board of Education etc. v. Pacific National Fire Insurance Co., 153 N.E. 2d 498, Appellate Court of Illinois, Oct. 21, 1958.

These summaries of court decisions are prepared by I. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts; Legal Guide for Contractors, Architects and Engineers;* and *Legal Cases for Contractors, Architects and Engineers.*

OFFICIAL PROPOSALS

Bids: April 30, 1959.

Board of Education—Bureau of Construction
Notice Re: Prequalification Forms for Contractors

NOTICE IS HEREBY GIVEN THAT The Superintendent of School Buildings, Bureau of Construction, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City 1, N. Y., will receive applications for prequalification from contractors who may wish to submit bids for the proposed hereinafter specified contracts as follows: general construction, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures and heavy kitchen and cafeteria equipment, Junior High School 246, Brooklyn Central Ave., between Covert and Eldert Streets.

Prequalification application forms will have to be secured from and must be submitted to the Superintendent of School Buildings, Bureau of Construction, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City 1, New York.

Bids when advertised, will be received from prequalified bidders only.

Time for submitting prequalification applications by contractors will expire on Thursday, April 30, 1959.

WILLIAM H. CORREALE
Superintendent of School Buildings,
Design and Construction

Dated: April 14, 1959.

Starting: Monday, April 20, 1959
Five (5) Days.

Bids: April 30, 1959.

Notice to Bidders

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Barge Canal Improvement Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., April 30, 1959 by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, the Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract U. S.-73 for
New Sixty Foot Gates, Associated Electrical and Mechanical Equipment at Guard Gate 1 and Guard Gate 2 and New Bridge and Approaches at Guard Gate 2, Waterford, Saratoga County, New York

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor The Gov. Alfred E. Smith State Office Bldg., Albany, New York.

(b) Department of Public Works, 270 Broadway, New York City, N. Y.

(c) In addition to the above mentioned offices, plans, maps and specifications for Contract U. S.-73 may be examined and obtained at the office of Mr. G. L. Nickerson, 353 Broadway, Albany, New York.

The deposit for Plans and Proposal Forms for Contract U. S.-73 is $25.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets is good condition, similar period, will be 50% of deposit.

The Engineer's Estimate of Cost for Contract U. S.-73 is confidential and will be made known at the time of receiving bids.

Proposals for Contract U. S.-73 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of five percentum, (5%) of the bid. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Barge Canal Improvement Law and to the Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

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OFFICIAL PROPOSALS

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5186) will be received at Collbran, Colorado, until 10 a.m., Mountain Standard Time, May 19, 1959, for furnishing labor and materials for earthwork, pipe and structures for Bonham and Cottonwood Pipeline, Collbran Project. Location near Collbran, Colorado. Principal items are 176,000 cu. yds. excavation; 114,000 cu. yds backfill; 1,500 cu. yds. concrete; furnishing and laying 58,270 lin. ft. of either prestressed concrete or steel pipe in sizes from 18-inch to 36-inch diameters; and other work. Completion time August 1, 1961. For particulars, address Bureau of Reclamation, P. O. Box 360, Salt Lake City, Utah; P. O. Box 780, Grand Junction, Colorado; P. O. Box 396, Collbran, Colorado; or Building 53, Denver Federal Center, Denver 25, Colorado. W. A. Dexheimer, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5181) will be received at Red Bluff, California until 10 a.m., Pacific Standard Time, May 28, 1959, for furnishing labor and materials for Corning Canal Pumping Plant Intake Channel and Discharge Lines, Central Valley Project, California. Location 3 miles southeast of Red Bluff, Tehama County, California. Principal items are excavation, 247,000 cu. yds.; concrete 3,200 cu. yds.; constructing pumping superstructure; and other work. Completion time 460 days. For particulars, address Bureau of Reclamation, P. O. Box 752, Red Bluff, California, P. O. Box 2511, Sacramento, California, or Building 53, Denver Federal Center, Denver 25, Colorado. W. A. Dexheimer, Commissioner.

General Services Administration, Public Buildings Service, Washington, D. C., April 17, 1959—Sealed bids for construction (except elevator and dumbwaiter) of New Operating Facilities, National Institutes of Health, Bethesda, Maryland, will be received until 2:00 PM EDT, May 19, 1959, in Rm. 7128, GSA Regional Office Building, 7th & D Sts., S. W., Washington 25, D. C., and then publicly opened in Rm. 7128 at the above address. Upon request, Public Buildings Service, Rm. 1306, GSA Bldg., 19th & F Sts., N. W., Washington 25, D. C., Phone EXecutive 3-4900, Ext. 2397, will furnish three sets of bidding material to General Contractors interested in bidding the complete project. Three additional sets may be obtained by depositing $50.00 per set. One set of drawings and specifications will be supplied to each principal subcontractor, as determined by the Service, upon receipt of deposit in the amount of $50.00. Deposits will be refunded for such sets if returned in good condition within fifteen days after bids are opened. Checks or money orders for deposits or furnished as bid guaranty must be made payable to the General Services Administration. One set of drawings and specifications will be furnished to builders' exchanges, chambers of commerce and other similar organizations, with the understanding that the set will be retained on their premises and made available for inspection by any interested subcontractor or material firm. Commissioner of Public Buildings, General Services Administration.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.40 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Bids: May 14, 1959

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y. — Pursuant to the provisions of the Highway Law, Public Buildings Law, and Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A. M., advanced standard time, which is nine-thirty o'clock A. M., eastern standard time, on the 14th day of May 1959, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, G. E. Nickerson, District Engineer, 333 Broadway, Albany 1, New York						
Albany	FASH 59-8	Albany South Side Route, Pt. 1 City of Albany: Fuller Road Alternate Proj. U-4142-1	0.56	9" Cem. Conc. Pavt. 26' 24' Wide	$26,000 Plans $5	$468,000
	FAC 56-5					
Schenectady	FATC 59-1	City of Schenectady, Crosstown Conn. FAC 57-18 Schenectady Crosstown Conn. Pt. 2 Fash 57-20 Proj. U-523-16	1.99	Traffic Signal Devices	$5,500 Plans $5	99,000
Warren (Int. Tour. Rte. 87)	FISH 59-9	Interstate Route 502 (Hudson River to Gurney Lane) Proj. I-1119-27	7.32 16.32 Accs.	9" Cem. Conc. Pavt. 2 @ 24' Var. Wide = 7.25 Mi. Miscell. Work = 0.07 Mi. Acc. = 2.19 Mi. Cem. Conc. Pavt. 1.72 Mi. Asp. Conc. Pavt. and 2.41 Mi. Bit. D.S.T. Gravel 10 Hwy. Sep. Struct. Comp. I-Beams 3 Sp. 130', 3 Sp. 130', 3 Sp. 126.5', 3 Sp. 126.5', 4 Sp. 214.5', 3 Sp. 127.1', 3 Sp. 127.1', 5 Sp. 272.4', 3 Sp. 136' and 3 Sp. 133'	$408,000 Plans $10	7,430,000
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 N. Genesee Street, Utica 1, New York						
Hamilton (Rte. 10)	RC 59-36	Long Lake Hamlet, S.H. 5015 Grove-Blue Mountain Lake, S.H. 8301	3.50	Asphalt Concrete Type 1A Pavt.	$7,500 Plans $5	138,000
Herkimer (Rte. 28)	RC 59-37	Herkimer-Middleville, S.H. 860 Middleville Village, S.H. 869 Middleville Village & Newport Village, S.H. 5004	6.00	Asphalt Concrete Type 1A Pavt.	$10,000 Plans $5	184,000
Madison	FASS 59-12	New Woodstock-Erieville Co. Rd. No. 52 Proj. S-536-1	5.47	Bit. Double Surf. Treat. Pavt.	$14,000 Plans $5	259,000
Oneida (Rte. 5)	RC 59-38	Kirkland-New Hartford, S.H. 9205 Utica-Oneida Castle Pt. 1, S.H. 250 New Hartford Village, S.H. 5052	2.07	Asphalt Concrete Type 1A Pavt.	$7,500 Plans $5	135,000
DISTRICT No. 3, Earle L. Towlson, Acting District Engineer, 333 E. Washington Street, Syracuse, New York						
ONONDAGA	FAC 59-4	City of Syracuse: Bear Street Arterial Highway Project U-1151-1	0.78	Asphalt Concrete Type 2A Pavt. Comp. Steel Girder Bridge 5 Spans - Total 591'	$66,000 Plans $5	1,197,000
DISTRICT No. 6, James H. Thomas, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Allegany (Rte. 244)	RC 59-39	Belmont-Phillips Creek, Pt. 1, S.H. 1559 Belmont-Phillips Creek, Pt. 2, S.H. 8475 Phillips Creek-Alfred, S.H. 8475	11.61	Asphalt Concrete	$26,000 Plans $5	472,000
DISTRICT No. 7, Robert W. Sayer, District Engineer, 317 Van Duzee Street, Watertown, New York						
Franklin (Rte. 3 & 30A)	RC 59-34	Waverly-Saranac Lake Pt. 2 & 3, S.H. 8437 Waverly-Saranac Lake, Pt. 1, S.H. 8491	11.57	Asphalt Concrete Type 1A Pavt.	$22,000 Plans $5	393,000
St. Lawrence	OBA 59-5	U. S. Approach to the Ogdensburg Bridge	0.73 0.28 Acc's	Asphalt Conc. Ty. 1A Pavt. = 0.93 Mi. 10" Conc. Conc. Pavt. Var. Wide = 0.01 Mi.	$20,000 Plans $5	368,000
DISTRICT No. 8, Kurt G. Rauch, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Columbia	FSP 59-1 RC 59-30	Taconic State Parkway Sect. 9 & 9D Rte. 23 to Rte. 203 Hudson-Millerton, S.H. 1230 Chatham-Spencertown, S.H. 546	11.92 1.33 Acc's	9" Cem. Conc. Pavt. Var. Wide = 1.50 Mi. Asph. Conc. Pavt. = 1.47 Mi. Gravel with Calc. Chloride Treat. = 0.43 Mi. Grad. & Drain. = 13.15 Mi. LRR Sep. Comp. I-Beam 3 Sp. 161.9' 4 Hy. Sept. Comp. I-Beams 2 Sp. 136.3', 3 Sp. 122', 3 Sp. 153.1' and 3 Sp. 119.3' Acc's 1 Hy. Sep. RC Rig. Frame 105' 1 Br. Comp. I-Beam 52' 1 Br. Reinf. Conc. Box 55.3' 1 Br. Reinf. Conc. Slab 30'	$500,000 Plans $10	6,503,000
Ulster (Rte. 9W)	RC 59-31	Old Post Road, S.H. 310 Old Post Road Pt. 1, S.H. 3508	3.78	Asphalt Concrete Pavt.	$12,000 Plans $5	230,000
DISTRICT No. 9, Joseph C. Frederick, District Engineer, 71 Frederick Street, Binghamton, New York						
Sullivan (Rte. 17 & 52)	TC 59-2	Monticello-Liberty Pt. 2, S.H. 5322 Intersection with S.H. 1691		Furnishing & Erecting Traffic Signals	$1,500 Plans $5	25,000
DISTRICT No. 10, M. J. Gucci, District Engineer, 225 W. Main Street, Babylon, L. I., New York						
Bronx (Int. Tour. Rte. 95)	FIBE 59-1	Interstate Route Connection 511 Bruckner Expressway (Layton Ave. to New England Thwy.) Sect. 2, Cont. 1 and Throgs Neck Expressway Connection Proj. I-1008-22	1.46 5.10 Acc's	9" Cem. Conc. Pavt. Curb Black 2 @ 36' Var. Wide = 1.46 Mi. Access = 1.68 Mi. Cem. Conc. Pavt. & 3.72 Mi. Sheet Asphalt Pavt. 6 Hy. Seps. Comp. WF Beam 2 Sp. 124.2' 2 Sp. 122.1' 2 Sp. 143.5', 2 Sp. 131.5', 2 Sp. 132.5' and 1 Sp. 60.3' 4 Ped. Overpasses I-Beams 5 Sp. 96.3', 3 Sp. 104.2', 5 Sp. 272.1' and 6 Sp. 302.4'	$635,000 Plans $10	$11,547,000
Nassau & Suffolk (Rtes. 106, 112 & 27)	FARC 59-35	Jones Inlet-Bay, S.H. 3021 Port Jefferson-Oquin, S.H. 942 Quogue-Southampton, S.H. 1274 Proj. S-500-1, S-552-1, and	1.10	Drainage Facilities	$19,000 Plans $5	240,000
Nassau & Suffolk	SAGSP RC 59-1 SMSP RC 59-1 SSP RC 59-2 NSP RC 59-1	Northern State Parkway Sagtikos State Parkway Sunken Meadow Spur Parkway and Southern State Parkway	30.05	Landscaping and Misc. Work	$14,000 Plans $5	257,000
Suffolk	B.P. 59-71	Ocean Beach Town of Islip	1.00	Beach Protection Artificial Beach Nourishment	$1,000 Plans $10	74,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act of 1956" being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 220 (Prevailing Rate of Wages), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 20 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: May 12, 1959

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS For Electrical Work at the Niagara Switchyard in Lewiston, Niagara County, New York

Specifications No. PA-N-25033
Niagara Contract No. N-11

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the Electrical Work at the Niagara Switchyard in Lewiston, Niagara County, New York until 10:30 A.M. Eastern Daylight Saving Time on the 12th day of May, 1959, at the Authority's office, 15th floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The work includes but is not limited to the installation of the following Authority furnished equipment consisting of 30,000 linear feet of high pressure oil pipe type cable, oil circuit breakers, disconnecting switches, lightning arresters, carrier current equipment, metering equipment, insulator assemblies and bus supports for 115 kv, 230 kv and 345 kv service, autotransformers, metalclad switchgear, unit substations, motor control centers, control battery and appurtenances, miscellaneous power transformers, lighting system and all wire and cable, the furnishing and installing of miscellaneous electrical equipment, all conduit and grounding, switchyard buses and connections, cable trays, and making electrical connections to equipment of a basically nonelectrical nature such as air compressors, insulating oil system, ventilating fans, fire protection system and sump pumps.

The work also includes the following nonelectrical items of work: Estimated:

159,200 cu. yds.	Excavation, unclassified, all types except Item A-1
8,100 linear ft.	Concrete culvert pipe, 12" to 36" Dia.
27,400 linear ft.	Subgrade drains
9,200 cu. yds.	Concrete
960,000 pounds	Reinforcement bars
2,540,000 pounds	Erection of switchyard structures and terminal towers
110,000 pounds	Installing genuine wrought iron pipe, fittings and valves, 2½" to and including 6" in diameter
350,000 pounds	Installing cast iron pipe, fittings and valves

This work shall be completed on or before December 21, 1962.

Plans, Specifications and Proposal Forms for the work, may be obtained from the POWER AUTHORITY OF THE STATE OF NEW YORK, at the Coliseum Tower, 18th Floor, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Twenty-Five ($25.00) Dollars per initial set of contract documents, and Ten ($10.00) Dollars per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, URS, HALL & RICH, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the information for bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum bid.

W. S. CHAPIN
GENERAL MANAGER

Correction Notice

The April 2, 1959 Engineering News-Record carried an Official Proposal for North Buffalo Creek Sewage Treatment Plant Additions, City of Greensboro, North Carolina with Bids: May 8, 1959.

Through an oversight the full name & address of the Consulting Engineers were omitted. Let it be known that: Harzen and Sawyer, 122 East 42 St., New York 17, N. Y. are the Consulting Engineers and that Contract Documents may be examined at their office.

Many contractors depend entirely upon the

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of

Engineering News-Record

for Opportunities to bid. They might not see your announcements if printed elsewhere.

You undoubtedly want their bids on your contracts. Make sure of them on your next contract.

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DISPLAYED RATE:
The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.
An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.
Subject to Agency Commission.

MAY 7TH ISSUE CLOSES APRIL 27TH

UNDISPLAYED RATE:
$2.40 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.
Position Wanted ads take ½ of above rate.
Box numbers—count as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.
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Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication
Send to office nearest you:
NEW YORK 36: P. O. BOX 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

General Superintendent for road-building. Familiar with gravel, asphalt and concrete. P-1174, Engineering News-Record.

Senior Civil Engineer for design work involving storm sewer, sanitary sewer, street paving and general municipal engineering projects. Salary range $6800 to $8800 with excellent fringe benefits. Degree in civil engineering plus six years experience required. Submit resume to City Engineer, City Hall, Schenectady, N. Y.

Wanted: Superintendent for State Highway Projects, Southern Ohio location. Write, giving full particulars to P-1162, Engineering News-Record.

Resident Engineer Wanted. Graduate engineer with experience in supervision of construction on water, sewerage, steam power and or building construction. Location generally midwest, but assignments may be to other areas of U. S. Established midwest consulting engineering firm. Reply in detail to P-1220, Engineering News-Record.

Engineer Estimator & General Supt. Retiring Sewer Contractor with considerable excavating Equipment desires 2 or 3 experienced supervisors men willing to invest in themselves to continue and expand a successful business established for 30 years. Experience more essential than cash. Good opportunity to get into business. Send resume of experience. P-1206, Engineering News-Record.

Sales Engineer, wanted by manufacturer of lightweight aggregate. Graduate Engineer with field experience desired, to sell and service Concrete Products and Ready Mix plants in Central and Northern Illinois. Salary, expenses and car furnished. Reply in detail to P-1198, Engineering News-Record.

• POSITIONS VACANT

Estimator—Electrical or Piping—Engineering and construction firm has position for experienced estimator to broaden his experience by assisting the coordination of design, estimating, purchasing and installation of instrument systems for process type plants. Contracting firm experience preferred. Salary open. Chicago suburban location. Send resume to Mr. W. A. Wecker, Panellit, Inc., 7301 N. Hamlin, Skokie, Illinois.

Asst. Prof. of Civil Engineering to teach fluid mechanics. Applicant must have MS in CE. Write to John A. Oakey, N. D. State College, Fargo, N. D., giving personal record and minimum acceptable 9 months salary.

Construction Superintendent, C. E. Must be experienced general construction, Public Works. Send resume stating age, education, experiences and references. Maine, P-1223, Engineering News-Record.

Engineers with extensive experience in the operation and maintenance of complex utilities systems are needed by the Air Defense Command at salaries starting at $7510 and $8810 a year. The openings are at electronic air defense installations and Division headquarters in the Southern and North Central parts of the country. The power, heat and air conditioning equipment in Sage installations is large and complex and includes diesel generating equipment operated in parallel, power plant switch gear equipment, high pressure fire tube steam boilers with associated equipment, refrigeration and air conditioning equipment of over 100 ton capacity, and other complicated equipment used in heating, ventilating and controls systems. Engineers employed in a Division headquarters will function in a staff capacity in such fields as Electrical, Mechanical, Heating, Air Conditioning, Diesel, Civil and Civil Planning, and General (Structural, Sanitary, Paving) Engineering. Inquiries about these positions and applications should be directed to the Director of Civilian Personnel, Headquarters Air Defense Command, Ent Air Force Base, Colorado Springs, Colorado.

(Continued on the following page)

ENGINEERS

OVERSEAS

DAM ENGINEER
POWERHOUSE ENGINEER
on
MULTI-PURPOSE DAM PROJECT in THAILAND

Require qualified engineer with responsible construction experience in placement of reinforcing steel, mass concrete pours, mass concrete cooling on large dams or other mass concrete projects. Degree preferred but not essential. Must pass physical examination and security investigation.

- EXCELLENT SALARY
- OVERSEAS BONUS
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SVERDRUP & PARCEL INTERNATIONAL
c/o SVERDRUP & PARCEL ENGINEERING COMPANY
915 Olive Street, St. Louis 1, Mo.

FACTORY REPRESENTATIVE

World's largest manufacturer of trenching machines is expanding force. Opportunity for continued growth. Excellent remuneration and expenses. Requires sales experience such as construction and road equipment, shovels and cranes, materials handling equipment, farm implements, etc. Considerable travel involved and possible relocation. All replies held in strictest confidence. Send detailed resume.

Attention L. M. Dunn
THE CLEVELAND TRENCHER CO.
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Construction Equipment Salesman

Good company. Good products. Growing (in size and stature) distributor organization. Salary plus commission arrangement that will let you do well today, better tomorrow. We know what it takes to hold men and help them grow. Some experience essential. Engineering degree desirable. Write in confidence.

SW-1501, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

Heavy Construction SUPERINTENDENT

Our expanding Heavy Construction Division is considering applications for a superintendent in work involving pile driving, dock construction, bridges, locks and dams in locations throughout the South. Write fully, giving education, past experience, references, availability, salary requirements and personal data to

Personnel Director
BLOUNT BROTHERS CONSTRUCTION CO.
P. O. Box 949 Montgomery, Alabama

ENGINEER ESTIMATOR

For Atlanta, Georgia area contractor. Permanent position making complete take-offs and bidding heavy general construction such as power plants, papermills, utility work; then handling contracts as Project Engineer. Start immediately, salary open.

P-1481, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

• POSITIONS VACANT

(Continued from preceding page)

Estimator. C.E., pricing. Knowledge of sq. ft. costs all types bldgs. Details, salary. P-1452, Engineering News-Record.

Public Works Administrator Vacancy as of May 1, 1959. Present salary $8,000 per year with expenses. Applications are now being accepted by the Board of Selectmen, Town of Billerica, Mass.

• EMPLOYMENT SERVICE

Better Positions—$6,000 to $35,000. Want a substantial salary increase, more opportunity or different location? This national 18 year old service connects you with best openings. You pay us only nominal fee for negotiations. This we refund when employer pays placement fee. Present position protected. In complete confidence, write for particulars. R. W. Bixby, Inc., 559 Brisbane Bldg., Buffalo, N. Y.

• POSITIONS WANTED

Construction Superintendent—experienced industrial, chemical, commercial. Middle Atlantic States preferred. PW-1440, Engineering News-Record.

Controller—Competent management accountant experienced finance and control multi-million dollar construction contracts. Knowledge costs, budgets, taxes, systems and procedures, all types contracts, corporate organizations and joint ventures. Head Office and field operations. PW-1407, Engineering News-Record.

Resident Engineer or Architect's Superintendent, experienced, competent. PW-1423, Engineering News-Record.

Construction Manager. Proven capability. $17,000.00 minimum. Available immediately. PW-1422, Engineering News-Record.

MS, 33, married. 10 years experience in bridge and industrial plants structural design, desires position with responsibility and future. Resume upon request. PW-1420, Engineering News-Record.

Supt. or General foreman—age 43—over 18 years experience highway construction supervising earthmoving equipment, excavating, drainage. Know men, methods and cost. Available at once. A-1 references. PW-1468, Engineering News-Record.

Architects & Engineers: Resident Project Manager, Superintendent, Inspector, 10 years experience construction field. Stateside & overseas. Available on short notice. PW-1435, Engineering News-Record.

Prestressed Concrete—Bachelor and Masters degree in civil eng., 3 years Navy Civil Engineer Corps, age 26, married, desire responsible position offering challenge and growth in prestress field, location anywhere, available Sept. '59. PW-1440, Engineering News-Record.

Construction Superintendent B.S.C.E., Hwy. Earthwork, Highways, Flood Control, 15 yrs. exp., bidding, estimating, supervising. E. Eiswirth, Box 18, Clayton, Mo., Pr. 3-3984.

WANTED
SUPERINTENDENT

experienced in building State Roads & Bridges. Salary commensurate with experience and ability to produce.

SHERIDAN CONSTRUCTION CORP.
3580 Sheridan Dr. Buffalo 26, N. Y.

SUPERINTENDENT

Take charge man to handle field operations for fast moving growing New Jersey contractor. Experience necessary in excavation, stone and asphalt paving, and some drainage. Field covers industrial, streets, highways, etc. Send resume and salary requirements to:

P-1488, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

Asphalt Superintendent—Thirteen Years experience in paving, grading, bases, and allied work. Good management, leadership, and organizing ability. Salary plus yearly percentage bonus. Prefer southern or western location. PW-1394, Engineering News-Record.

Purchasing Agent—Thorough knowledge of modern purchasing procedures with experience in heavy manufacturing (including foundry) and heavy construction (including CPFF—Married—No children—will relocate for permanent position. PW-1400, Engineering News-Record.

Structural Engineer—Extensive National Experience. Registered. Desires executive position or partnership. Midwest or western location. PW-1449, Engineering News-Record.

Paving & Materials Engr., BCE, SM, 4 overseas Airfield projects controlling soils, asphalt, concrete, surveying, independent responsibility, managed personnel. PW-1437, Engineering News-Record.

Prestressed Concrete Plant Manager—MSCE —Experienced Engineer capable of designing, building and managing an efficient prestressed concrete plant. PW-1482, Engineering News-Record.

Project Engineer: Location and construction of railways, highways, bridges, tunnels, docks, townsites, etc., in Latin America or south. Fluent Spanish. Technical ability and experience rarely equalled. Highest references. PW-1395, Engineering News-Record.

Supt. or Foreman, General Construction. PW-1421, Engineering News-Record.

P.E., Consultant, complete buck conveyor sys., cement, steel, power, sugar, sand, and gravel plants. Screening, crushing, stc. Boat loading & unloading, etc. Dom. or foreign. Available June. PW-1448, Engineering News-Record.

Construction Bookkeeper and General office man, open for position. Life experience in Bookkeeping, cost accounting, payroll and other phases. Have had experience in Latin countries which is preferred. Also have const. account. code Spanish, English. M. G. Waller—Box 214, Lantana, Fla.

Structural Engineer, AMICE., AM.ASCE., P.E. Age 42, 14 yrs. heavy industrial experience in steel, concrete and foundation design with consultants and industry. Presently squad leader. Seeks responsible permanent position. Preferred location South. PW-1446, Engineering News-Record.

Project manager general superintendent 25 years heavy construction specializing in tunnels, shafts underground work. Extensive foreign experience. Will work anywhere. PW-1451, Engineering News-Record.

Civil Engineer, age 33, B.C.E., P.E. 9 yrs. experience. Industrial, Building design and construction. Desire permanent, responsible position with opportunity for advancement. PW-1444, Engineering News-Record.

Ambitious Young Man—Age 22 Married— desires position in Arizona or New Mexico—3½ years Civil Engineering at accredited college—1½ years experience with contracting firm. Presently employed. PW-1445, Engineering News-Record.

Civil Engineer, German degree, speaking German, Spanish, English, experienced in structural design, field supervision and management, 20 years activities in South America, wants appropriate position. PW-1491, Engineering News-Record.

Civil Engineer available. Graduate, registered, 12 years of excellent and thorough experience estimating and purchasing all types of heavy industrial, commercial, and public works projects. PW-1497, Engineering News-Record.

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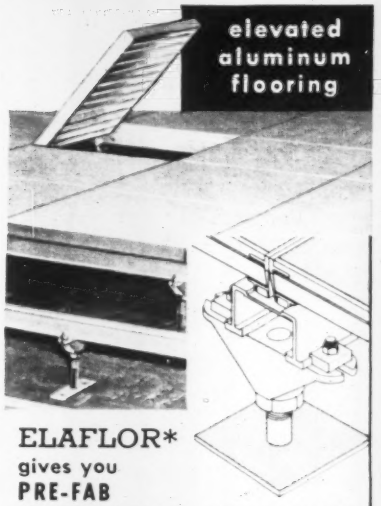

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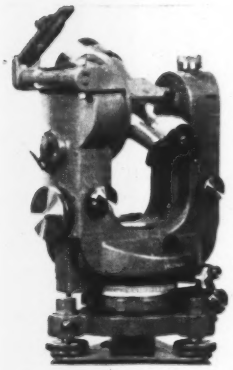

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R&D in Construction

IT HAS BEEN NOTED BEFORE on this page that in our industry it is common to think and talk of the major areas of planning, design and construction. It might be well if more people in the industry thought occasionally along the functional lines of manufacturers: research, development, design, production, marketing. For certainly, whether they realize it or not, construction men do perform all five of these functions. That they must market their service is quite obvious. They also do considerable research and development work, though they may call it planning or preliminary design.

Two outstanding examples of what we mean were published in a recent issue. Research and development by people in construction went into a new concept of passenger handling for Washington International Airport (ENR Apr. 9, p. 23), and into a new way to cool aggregates for mass concrete in a dam (p. 38).

On the airport, the architects-engineers concerned with terminal layout were given a scant three years from the time they were commissioned to the scheduled initial operation of the facility in January, 1961. Spokesmen for the prime consultant, Ammann & Whitney, consider it significant that they spent the entire first year of the three-year period doing research and development on the terminal layout for a jet airport bigger than any built before. It is particularly significant that they refer to their work to date as R&D. Most consultants would have called it preliminary design, or studies.

Result of this R&D for the Chantilly, Va., airport is the new notion of a simple, rectangular terminal building that will have, in effect, a continuous bay of mobile lounges. These will detach themselves from the structure and move a mile or more to attach similarly to the jet planes. Passengers will load onto planes as easily as walking into the next room. Simple? Sure. But a year of brainpower went into the concept and its development to the point of acceptance by the airlines.

In the other significant instance of recent developmental work in construction, a contractor has worked with a manufacturer to apply a known concept and evolve a new method of cooling aggregate for concrete dam construction. Guy F. Atkinson Co. successfully borrowed the steam jet ejector principle of creating vacuum, applied it to cooling aggregates.

Result of this thinking on the part of a constructor was not origination of a new concept. But his research into an old method used elsewhere—for cooling, evaporating and freeing liquids of entrained gases—led to its use on the Savannah River's Hartwell Dam in place of conventional refrigeration. A full-scale vacuum-type refrigeration plant is in use on a full-scale construction job, cooling rock, sand and water for concrete—thanks to the R&D of a thinking contractor. It works, and information on its relative cost will be awaited by construction men everywhere.

It should be recognized that R&D by the planners, designers and builders of construction is considerable. ENR is replete weekly with the results—new designs, methods and techniques. But these results might be even more numerous and important if everyone in construction were more attuned to the need to explore the unknown, try the untried, and accommodate the unadapted, as necessary functions in the construction process. All should be more aware of the benefits of R&D.

Changing Patterns

THE POWERFUL INFLUENCE of the highway program in generating construction on all manner of other facilities has already been proved in a number of notable cases. Massachusetts Route 128, the circumferential expressway around Boston, is lined with the modern buildings of manufacturing and research companies that have been quick to take advantage of the superior transportation service offered by the new artery. Along the New York Thruway, industrial investment of all kinds has boomed. And in every city that the Interstate System touches, patterns are undergoing change.

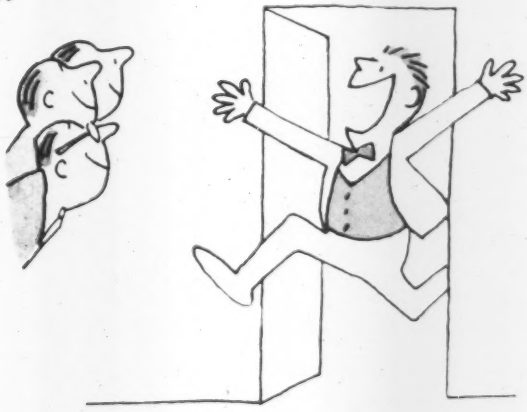
As more mileage is opened to traffic, these kinds of changes will multiply and new ones will appear. An example of the latter—a change in the motel industry—is predicted in a study by Clinton Warne, assistant professor of economics of the University of Kansas, published in a recent issue of the University's Kansas Business Review. Not only will the higher-speed roads dictate new locations for motels, they also will cause the introduction of the larger, more costly motor-hotel, Professor Warne concludes.

In assessing Kansas prospects, Professor Warne notes that the new roads will undoubtedly bring many more travelers into the state, but that the increased daily driving distances, which the roads make possible, will cause fewer of them to stop for the night, at least in the central region. On the other hand, there will be new natural terminus areas on the high-speed highways, where more motorists than ever will want to stop. Moreover, at these points, wherever they may be, the traveler will demand all the services and conveniences of a city hotel, plus the others a motel can offer. The big motor-hotel type of layout will be the only answer.

These changing patterns of facility development that will follow in the wake of new highway building—and the motel is only one small example—offer many opportunities for the construction industry. Not only will they generate actual construction, but the changes will challenge planners and designers to anticipate them early, and so have time to assure that the resulting developments will be efficiently located and laid out.

Al protects *his* road with an umbrella

1.



"All mine!" Al Arch exploded as he tumbled through his door.
"That superhighway contract from the city to the shore!"
His men assembled round him and each took him by the hand.
Our hero felt, as you'd expect, just simply, wholly GRAND!

2.

His Travelers man stopped in to find him gazing pensively.
Said Al, "Your bond was super-fast and right as it could be,
But we push off to start at dawn, we need a covering plan!"
"We quickly handle every need," replied his Travelers man.

3.

"You have our Workman's Comp and Public Liability.
So if a man gets hurt, he's *our* responsibility.
And our Equipment Floater is good fortune's best defense:
Collision, upset, fire, theft – not yours, but *our* expense.

4.

"And finally, our Builder's Risk Insurance can't be beat,
Protects like an umbrella till your venture is *complete*."
If *you've* a highway in the works, be sure to check this plan.
Just make a call, he's on the ball, your able Travelers man.

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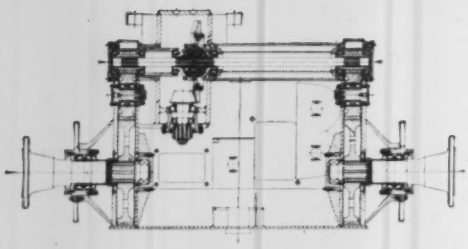

How **ALLIS-CHALMERS** mounts Timken bearings in the transmission of its TS-360 motor scraper to take heavy loads, cut maintenance.

Big capacity, big power for big economy, 28 Timken bearings keep it rolling

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3) *By holding shafts concentric* with housings, Timken bearings make closures more effective in keeping dirt out, lubricant in, maintenance down.

4) *And Timken bearings are made of finest steel.* We make it ourselves to be sure. We're America's only bearing maker that does.

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